# 51st AVENUE SAFETY IMPROVEMENT STUDY

SECTIONS 20, 21, 28, 29, 32 and 33, T1N, R2E 4, 5, 8, 9, 16, 17, 20, 21, 28, 29, 32 and 33, T1S, R2E

# MCDOT TRANSPORTATION PLANNING DIVISION

WORK ORDER NO. 68913

# TECHNICAL APPENDIX

## 51st AVENUE SAFETY IMPROVEMENT STUDY

SECTIONS 20, 21, 28, 29, 32 and 33, T1N, R2E 4, 5, 8, 9, 16, 17, 20, 21, 28, 29, 32 and 33, T1S, R2E

### MCDOT TRANSPORTATION PLANNING DIVISION

WORK ORDER NO. 68913

# **TECHNICAL APPENDIX**



SEPTEMBER, 1997

# Technical Appendix

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1997 Turning Movement Summary - Peak Hour (Total) - Peak Season - No Casino

Intersection		Northboun	d	. i i i i i i i i i i i i i i i i i i i	outhboun	d		Eastbound	d		Westbou	nd	Peak Hour	Percent
	Lt	Th	Rt	Lt	Th	⊯ Rt 💮	Lt	Th	≗ Rt 🐩	Lt	Th	Rt	Factor	Trucks
AM Peak Hour					major of more below of the bendge	Segretar continual independent		atitimals tragenescolmin.	THE STATE OF THE S	institution activities	HIRA SHIP GAMESTI			I WELL
51st Ave / Pecos Road	5	205	10	5	243	0	5	0	0	5	0	15		
51st Ave / St. Johns Road	10	230	0	0	243	20	35	0	15		Ū			
51st Ave / Casino Entrance		260			195									
51st Ave / Dusty Lane		270	15	20	185					10		15		
51st Ave / Estrella Drive	10	265	10	15	195	10	20		5	5		35		
51st Ave / Elliot Rd	4	283	1	0	192	3	3	1	8	1	4	2	0.94	19.6%
51st Ave / Dobbins Rd	13	224	52	34	166	5	12	45	10	44	32	47	0.86	12.3%
51st Ave / Baseline Rd	30	267	51	73	177	30	33	119	33	22	66	47	0.92	14.8%
51st Ave / Southern Ave	8	281	20	111	239	9	20	71	4	13	32	62	0.97	13.1%
51st Ave / Broadway Rd	26	351	0	0	299	19	46	0	70	0	0	0	0.91	14.9%
							*					Average	0.89	13.0%
PM Peak Hour						ļ							0.05	15,0 70
51st Ave / Pecos Road	5	240	10	10	280	0	10	5	5	15	5	30		
51st Ave / St. Johns Road	10	270			285	20	35		15					
51st Ave / Casino Entrance		265			260									
51st Ave / Dusty Lane		249	15	20	253					10		15		
51st Ave / Estrella Drive	10	254	10	15	278	10	20		5	5		35		
51st Ave / Elliot Rd	7	238	0	3	306	4	0	1	9	0	0	1	0.93	13.9%
51st Ave / Dobbins Rd	10	207	19	30	255	10	8	28	11	30	31	26	0.94	12.2%
51st Ave / Baseline Rd	23	220	31	71	263	59	32	80	38	40	110	56	0.87	8.1%
51st Ave / Southern Ave	10	252	16	86	339	20	17	40	7	27	115	86	0.96	6.5%
51st Ave / Broadway Rd	38	347	0	0	443	35	15	0	32	0	0	0	0.87	9.5%
								·		-		Average	0.89	8.0%

### 00tot-season

N-S Growth 5.1% 1997 Start E-W Growth 6.2% 2000 End

# 2000 Turning Movement Summary - Peak Hour (Total) - Peak Season - No Casino

Intersection		Northboun	$\mathbf{d}_{i,j}$		Southboun	d		Eastbound			Westbound	i i
	Lt. 33	Th	· Rt	a Lta	This	⊪,≉Rt :::	Lts	Th	Rt	Lt	Th	Rt
AM Peak Hour					an and the state of the state o	, control of the cont		a manageographics reconstruction	andona - piercesulad	ankipedhaeetaaldei, Keie	Edition of the	
51st Ave / Pecos Road	10	240	15	10	285	0	10	0	0	10	. 0	20
51st Ave / St. Johns Road	15	270	0	0	285	25	45	0	20	0	0	0
51st Ave / Casino Entrance	0	300	0	0	225	0	0	0	. 0	0	0	0
51st Ave / Dusty Lane	0	315	20	25	215	0	0	0	0	15	0	20
51st Ave / Estrella Drive	15	310	15	20	225	15	25	0	10	- 10	0	45
51st Ave / Elliot Rd	5	330	5	0	225	5	5	5	10	5	5	5
51st Ave / Dobbins Rd	15	260	60	40	195	10	15	55	15	55	40	60
51st Ave / Baseline Rd	35	310	60	85	205	35	40	145	40	30	80	60
51st Ave / Southern Ave	10	325	25	130	280	15	25	. 85	5	20	40	75
51st Ave / Broadway Rd	30	405	0	0	345	25	55	0	85	0	0	0
PM Peak Hour										,		
51st Ave / Pecos Road	10	280	15	15	325	0	15	10	10	20	10	40
51st Ave / St. Johns Road	15	315	0	0	330	25	45	0	20	0	0 .	0
51st Ave / Casino Entrance	0	310	0	0	300	0	0	0	0	0	0	0
51st Ave / Dusty Lane	0	290	20	25	295	0	0	0	0	15	0	20
51st Ave / Estrella Drive	15	295	15	20	325	15	25	0	10	10	0	45
51st Ave / Elliot Rd	10	275	0	5	355	5	0	5	15	0	0	5
51st Ave / Dobbins Rd	15	240	25	35	295	15	10	35	15	40	40	35
51st Ave / Baseline Rd	30	255	40	85	305	70	40	95	50	50	135	70
51st Ave / Southern Ave	15	295	20	100	395	25	25	50	10	35	140	105
51st Ave / Broadway Rd	45	405	0	. 0	515	45	20	0	40	0	0	0
			1						1			

### 05tot-season

N-S Growth

5.1%

1997 Start

E-W Growth

6.2%

2005 End

### 2005 Turning Movement Summary - Peak Hour (Total) - Peak Season- No Casino

Intersection	Figure 1	lorthboun	d. Francisco		outhboun	d		Eastbound		W	/estbound	ja, jak
	Lt	Th	Rt≕-	ij "Li	Th:	∌ Rt 🛶	Lt .	Th	Rt	Ltu	Th	Rt
AM Peak Hour												<del>- i i j , , , , , i , , , , , , , , , , ,</del>
51st Ave / Pecos Road	10	290	15	10	345	0	10	0	0	10	0	25
51st Ave / St. Johns Road	15	325	0	0	345	30	55	0	25	0	0	0
51st Ave / Casino Entrance	0	370	0	0	275	0	0	0	0	0	0	0
51st Ave / Dusty Lane	0	385	25	30	265	0	0	0	0	15	0	25
51st Ave / Estrella Drive	15	375	15	25	275	15	30	0	10	10	0	55
51st Ave / Elliot Rd	10	400	5	0	275	5	5	5	15	5	10	5
51st Ave / Dobbins Rd	20	320	75	50	235	10	20	70	15	70	- 50	75
51st Ave / Baseline Rd	45	380	75	105	250	45	50	180	50	<sup>'</sup> 35	100	75
51st Ave / Southern Ave	15	400	30	160	340	15	30	110	10	20	50	95
51st Ave / Broadway Rd	40	495	0	0	425	30	70	0	105	0	0	0
PM Peak Hour												
51st Ave / Pecos Road	10	340	15	15	395	0	15	10	10	25	10	45
51st Ave / St. Johns Road	15	385	0	0	405	30	55	0	25	0	0	0
51st Ave / Casino Entrance	0	375	0	0	370	0	0	0	0	0	0	0
51st Ave / Dusty Lane	0	355	25	30	360	0	0	0	0	15	0	25
51st Ave / Estrella Drive	15	360	15	25	395	15	30	0	10	10	0 .	55
51st Ave / Elliot Rd	10	340	0	5	435	10	0	5	15	0	0	5
51st Ave / Dobbins Rd	15	295	30	45	360	15	15	45	20	45	50	40
51st Ave / Baseline Rd	35	310	45	100	375	85	50	120	60	60	165	85
51st Ave / Southern Ave	15	355	25	125	480	30	30	60	15	45	175	130
51st Ave / Broadway Rd	55	490	0	0	625	50	25	0	50	0	0	0
	L			<u> </u>								

casino\_tmc

## Casino Peak Hour Turning Movement Summary

Intersection		Northbou	id 🦫 🏥	197 (1982) 197 (1982)	Southbound	i	7.73	Eastboun	d (323)		Westbound
	Lt	Th	Rt	El,	This	Rt	Ma Lta	Th	Rt	Lt	Th Rt
AM Peak Hour							a company of the contract of t		The later court of a section process as the section of	Principle Company	Communication and International Communication of the Communication of th
51st Ave / Pecos Road		10		5	7	5	5				· 5
51st Ave / St. Johns Road		20			17						
51st Ave / Casino Entrance			20	120		·				17	85
51st Ave / Dusty Lane		85			120					ļ	
51st Ave / Estrella Drive		85			120						
51st Ave / Elliot Rd		85			120		ĺ			l t	
51st Ave / Dobbins Rd	0	85	0		110			•	5	5	
51st Ave / Baseline Rd	0	80	5		95			•	5	10	
51st Ave / Southern Ave	0	80	0		85				5	5	
51st Ave / Broadway Rd		80			85						
PM Peak Hour				•							
51st Ave / Pecos Road		20		5	20	5	5				. 5
51st Ave / St. Johns Road		30			30						
51st Ave / Casino Entrance			30	172						30	171
51st Ave / Dusty Lane		171	ŧ		172						
51st Ave / Estrella Drive		171			172						
51st Ave / Elliot Rd		170			170						
51st Ave / Dobbins Rd	5	160	5		160				5	5	
51st Ave / Baseline Rd	5	145	10		145				5	10	
51st Ave / Southern Ave	5	135	5		135				5	5	
51st Ave / Broadway Rd		135			135						

1997 Turning Movement Summary - Peak Hour (Total) - Peak Season - With Casino

	orthboun	d: P.	la - S	outhboun	d		Eastbound			Westboun	d
Designation of the second second	THE PERSON NEWSFILM WITH	CALL BOTTOM DE LA CALLE DE LA CALLED CONTROL DE LA	a somethe care miteriality	E Th	√. Rt	∰: Etal	Department of the contract of	THE PERSON NAMED IN COLUMN	dan hayancan banka	Th	Rt .
							Samuel Manager Committee (	× 1			
5	215	10	10	250	5	10	0	0	5	0	20
10	250	0	0	260	20	35	0	15	) o	0	0
0	260	20	120	195	0	0	0	0	20	0	85
0	355	15	20	305	0	0	0	0	10	0	15
10	350	10	15	315	10	20	0	5	5	0	35
5	370	5	0	315	5	5	.5	10	5	5	5
15	310	55	35	280	5	15	45	15	50	35	50
30	350	60	75	275	30	35	120	40	35	70	50
10	365	20	115	325	10	20	75	10	20	35	65
30	435	0	0	385	20	50	0	70	0	0	0
5	260	10	15	300	5	15	5	5	15	5	35
10	300	0	0	315	20	35	0	15	, 0	0	0
0	265	30	175	260	0	0	0	0	30	0	175
0	420	15	20	425	0	0	0	0	10	0	15
10	425	10	15	450	10	20	0	5	5	0	35
10	410	0	5	480	5	0	5	10	0 .	0	5
15	370	25	30	415	10	10	30	20	35	35	30
30	365	45	75	410	60	35	80	45	.50	110	60
15	390	25	90	475	20	20	40	15	35	115	90
40	485	0	0	580	35	15	0	35	0	0	0
	5 10 0 0 10 5 15 30 10 30 5 10 0 0 10 10 10 10 10 10 10 10 10 10 10	5 215 10 250 0 260 0 355 10 350 5 370 15 310 30 350 10 365 30 435  5 260 10 300 0 265 0 420 10 425 10 410 15 370 30 365 15 390	5       215       10         10       250       0         0       260       20         0       355       15         10       350       10         5       370       5         15       310       55         30       350       60         10       365       20         30       435       0          5       260       10         10       300       0         0       265       30         0       420       15         10       410       0         15       370       25         30       365       45         15       390       25	5       215       10       10         10       250       0       0         0       260       20       120         0       355       15       20         10       350       10       15         5       370       5       0         15       310       55       35         30       350       60       75         10       365       20       115         30       435       0       0         5       260       10       15         10       300       0       0         0       265       30       175         0       420       15       20         10       425       10       15         10       410       0       5         15       370       25       30         30       365       45       75         15       390       25       90	5       215       10       10       250         10       250       0       0       260         0       260       20       120       195         0       355       15       20       305         10       350       10       15       315         5       370       5       0       315         15       310       55       35       280         30       350       60       75       275         10       365       20       115       325         30       435       0       0       385            5       260       10       15       300         10       300       0       0       315         0       265       30       175       260         0       420       15       20       425         10       425       10       15       450         10       410       0       5       480         15       370       25       30       415         30       365       45       75       410         15	5       215       10       10       250       5         10       250       0       0       260       20         0       260       20       120       195       0         0       355       15       20       305       0         10       350       10       15       315       10         5       370       5       0       315       5         15       310       55       35       280       5         30       350       60       75       275       30         10       365       20       115       325       10         30       435       0       0       385       20            5       260       10       15       300       5         10       300       0       0       315       20         0       265       30       175       260       0         0       420       15       20       425       0         10       425       10       15       450       10         10       410       0       5       480 <td>5       215       10       10       250       5       10         10       250       0       0       260       20       35         0       260       20       120       195       0       0         0       355       15       20       305       0       0         10       350       10       15       315       10       20         5       370       5       0       315       5       5         15       310       55       35       280       5       15         30       350       60       75       275       30       35         10       365       20       115       325       10       20         30       435       0       0       385       20       50         5       260       10       15       300       5       15         10       300       0       0       315       20       35         0       265       30       175       260       0       0         0       420       15       20       425       0       0</td> <td>5         215         10         10         250         5         10         0           10         250         0         0         260         20         35         0           0         260         20         120         195         0         0         0           0         355         15         20         305         0         0         0           10         350         10         15         315         10         20         0           5         370         5         0         315         5         5         5           15         310         55         35         280         5         15         45           30         350         60         75         275         30         35         120           10         365         20         115         325         10         20         75           30         435         0         0         385         20         50         0           5         260         10         15         300         5         15         5           10         300         0         &lt;</td> <td>5       215       10       10       250       5       10       0       0         10       250       0       0       260       20       35       0       15         0       260       20       120       195       0       0       0       0         0       355       15       20       305       0       0       0       0         10       350       10       15       315       10       20       0       5         5       370       5       0       315       5       5       5       10         15       310       55       35       280       5       15       45       15         30       350       60       75       275       30       35       120       40         10       365       20       115       325       10       20       75       10         30       435       0       0       385       20       50       0       70         5       260       10       15       300       5       15       5       5         10       300</td> <td>5         215         10         10         250         5         10         0         0         5           10         250         0         0         260         20         35         0         15         0           0         260         20         120         195         0         0         0         0         20           0         355         15         20         305         0         0         0         0         10           10         350         10         15         315         10         20         0         5         5           5         370         5         0         315         5         5         5         10         5           15         310         55         35         280         5         15         45         15         50           30         350         60         75         275         30         35         120         40         35           10         365         20         115         325         10         20         75         10         20           30         435         0         0</td> <td>5         215         10         10         250         5         10         0         0         5         0           10         250         0         0         260         20         35         0         15         0         0           0         260         20         120         195         0         0         0         0         20         0           0         355         15         20         305         0         0         0         0         10         0           10         350         10         15         315         10         20         0         5         5         0           5         370         5         0         315         5         5         5         10         5         5           15         310         55         35         280         5         15         45         15         50         35           30         350         60         75         275         30         35         120         40         35         70           10         365         20         115         325         10         20</td>	5       215       10       10       250       5       10         10       250       0       0       260       20       35         0       260       20       120       195       0       0         0       355       15       20       305       0       0         10       350       10       15       315       10       20         5       370       5       0       315       5       5         15       310       55       35       280       5       15         30       350       60       75       275       30       35         10       365       20       115       325       10       20         30       435       0       0       385       20       50         5       260       10       15       300       5       15         10       300       0       0       315       20       35         0       265       30       175       260       0       0         0       420       15       20       425       0       0	5         215         10         10         250         5         10         0           10         250         0         0         260         20         35         0           0         260         20         120         195         0         0         0           0         355         15         20         305         0         0         0           10         350         10         15         315         10         20         0           5         370         5         0         315         5         5         5           15         310         55         35         280         5         15         45           30         350         60         75         275         30         35         120           10         365         20         115         325         10         20         75           30         435         0         0         385         20         50         0           5         260         10         15         300         5         15         5           10         300         0         <	5       215       10       10       250       5       10       0       0         10       250       0       0       260       20       35       0       15         0       260       20       120       195       0       0       0       0         0       355       15       20       305       0       0       0       0         10       350       10       15       315       10       20       0       5         5       370       5       0       315       5       5       5       10         15       310       55       35       280       5       15       45       15         30       350       60       75       275       30       35       120       40         10       365       20       115       325       10       20       75       10         30       435       0       0       385       20       50       0       70         5       260       10       15       300       5       15       5       5         10       300	5         215         10         10         250         5         10         0         0         5           10         250         0         0         260         20         35         0         15         0           0         260         20         120         195         0         0         0         0         20           0         355         15         20         305         0         0         0         0         10           10         350         10         15         315         10         20         0         5         5           5         370         5         0         315         5         5         5         10         5           15         310         55         35         280         5         15         45         15         50           30         350         60         75         275         30         35         120         40         35           10         365         20         115         325         10         20         75         10         20           30         435         0         0	5         215         10         10         250         5         10         0         0         5         0           10         250         0         0         260         20         35         0         15         0         0           0         260         20         120         195         0         0         0         0         20         0           0         355         15         20         305         0         0         0         0         10         0           10         350         10         15         315         10         20         0         5         5         0           5         370         5         0         315         5         5         5         10         5         5           15         310         55         35         280         5         15         45         15         50         35           30         350         60         75         275         30         35         120         40         35         70           10         365         20         115         325         10         20

2000 Turning Movement Summary - Peak Hour (Total) - Peak Season - With Casino

Intersection		Vorthbound		S	outhbour	nd		Eastbound			Westbound	
	Lt	The	Rt	ia Lt :	$_{ij}$ The $_{ij}$	:::Rt :::	Lte	Th	Rt	Lt	Th	Rt
AM Peak Hour								<u> </u>			· · · · · · · · · · · · · · · · · · ·	
51st Ave / Pecos Road	10	250	15	15	295	5	15	0	0	10	0	25
51st Ave / St. Johns Road	15	290	0	0	305	25	45	0	20	0	0	. 0
51st Ave / Casino Entrance	0	300	20	120	225	0	0	0	0	20	0	85
51st Ave / Dusty Lane	0	400	20	25	335	0	0	0	0	15	0	20
51st Ave / Estrella Drive	15	395	15	20	345	15	25	0	10	10	0	45
51st Ave / Elliot Rd	5	415	5	0	345	5	5	5	. 10	5	5	5
51st Ave / Dobbins Rd	15	345	60	40	305	10	15	55	20	60	40	60
51st Ave / Baseline Rd	35	390	65	85	300	35	40	145	45	40	80	60
51st Ave / Southern Ave	10	405	25	130	365	15	25	85	10	25	40	75
51st Ave / Broadway Rd	30	485	0	0	430	25	55	0	85	0	0	0
PM Peak Hour												
51st Ave / Pecos Road	10	300	15	20	345	5	20	10	10	20	10	· 45
51st Ave / St. Johns Road	15	345	0	0	360	25	45	0	20	0	0	0
51st Ave / Casino Entrance	0	310	3.0	175	300	0	0	0	0	30	0	175
51st Ave / Dusty Lane	0	465	20	25	470	0	0	0	0	15	0	20
51st Ave / Estrella Drive	15	470	15	20	500	15	25	0	10	10	0	45
51st Ave / Elliot Rd	10	445	0	5	525	5	0	5	15	0	0	5
51st Ave / Dobbins Rd	20	400	30	35	455	15	10	35	20	45	40	35
51st Ave / Baseline Rd	35	400	50	85	450	70	40	95	55	60	135	70
51st Ave / Southern Ave	20	430	25	100	530	25	25	50	15	40	140	105
51st Ave / Broadway Rd	45	540	0	0	650	45	20	0	40	0	0	0

2005 Turning Movement Summary - Peak Hour (Total) - Peak Season- With Casino

Intersection		Northbound		4	Southbound	<b>d</b>		Eastbound			Westbound	1
	Lt	Th	- Rt	Lts	Th	⊪. Rt'	a continue management	Th ∷	mietrico di la constanta de la	Lt.	Th	Rt
AM Peak Hour			y 100 200 200 200 200 200 200 200 200 200	THE PERSON NAMED IN THE OWNER.	Hand Company of the Party of th	e words a superior su		DECEMBER OF THE PROPERTY OF	come; unucumente esces.	Comment of the state of the sta	months of the second	arte established a set of great
51st Ave / Pecos Road	10	300	15	15	355	5	15	0	0	10	0	30
51st Ave / St. Johns Road	15	345	0	0	365	30	55	0	25	0	0	0
51st Ave / Casino Entrance	0	370	20	120	275	0	- 0	0	0	20	0	85
51st Ave / Dusty Lane	0	470	25	30	385	0	0	0	0	15	0	25
51st Ave / Estrella Drive	15	460	15	25	395	15	30	0	10	10	0	55
51st Ave / Elliot Rd	10	485	5	0	395	5	5	5	15	5	10	5
51st Ave / Dobbins Rd	20	405	75	50	345	10	20	70	20	75	50	75
51st Ave / Baseline Rd	45	460	80	105	345	45	50	180	55	45	100	75
51st Ave / Southern Ave	15	480	30	160	425	15	30	110	15	25	50	95
51st Ave / Broadway Rd	40	575	0	0	510	30	70	0	105	0	0	0
PM Peak Hour						-						
51st Ave / Pecos Road	10	360	15	20	415	5	20	10	10	25	10	50
51st Ave / St. Johns Road	15	415	0	0	435	30	55	0	25	0	0	. 0
51st Ave / Casino Entrance	0	375	30	175	370	0	0	0	0	30	0:	175
51st Ave / Dusty Lane	0	530	25	30	535	0	0	0	0	15	0	25
51st Ave / Estrella Drive	15	535	15	25	570	15	30	0	10	10	0	55
51st Ave / Elliot Rd	10	510	0	5	605	10	0	5	15	. 0	0	5
51st Ave / Dobbins Rd	20	455	35	45	520	15	15	45	25	50	50	40
51st Ave / Baseline Rd	40	455	55	100	520	85	50	120	65	70	165	85
51st Ave / Southern Ave	20	490	30	125	615	30	30	60	20	50	175	130
51st Ave / Broadway Rd	55	625	0	0	760	50	25	0	50	0	0	0

### Daily-Season-Bk

Peak Season Daily Traffic Volumes - No Casino Traffic

ecos Rd Pecos Road Dusty Lane Estrei a Drive Dobb is Road Basel ie Road South rn Avenue Broac	s Road y Lane lla Drive pins Road line Road nern Avenue dway Road	Northbound 2,675 2,995 2,751 3,179 3,300 3,664 4,179  Eastbound 115	2,675 2,995 2,783 3,083 3,361 3,619 4,137  Westbound	3,090 3,460 3,180 3,670 3,810 4,230 4,820  Eastbound	3,090 3,460 3,210 3,560 3,880 4,180 4,770  Westbound	3,770 4,220 3,880 4,480 4,650 5,160 5,890	3,770 4,220 3,920 4,350 4,740 5,100 5,830  Westbound
Road Dusty Lane Estre a Drive Dobb as Road Basel ae Road South rn Avenue Broad	/ Lane // Lane	2,995 2,751 3,179 3,300 3,664 4,179	2,995 2,783 3,083 3,361 3,619 4,137	3,460 3,180 3,670 3,810 4,230 4,820	3,460 3,210 3,560 3,880 4,180 4,770	4,220 3,880 4,480 4,650 5,160 5,890	4,220 3,920 4,350 4,740 5,100 5,830
Lane Estreian Dobbies Road Basel Road South Broad	lla Drive bins Road line Road nern Avenue dway Road	2,751 3,179 3,300 3,664 4,179	2,783 3,083 3,361 3,619 4,137	3,180 3,670 3,810 4,230 4,820	3,210 3,560 3,880 4,180 4,770	3,880 4,480 4,650 5,160 5,890	3,920 4,350 4,740 5,100 5,830
a Drive Dobb as Road Basel ae Road South an Avenue Broad  1st Avenue 51st A	oins Road line Road nern Avenue dway Road Avenue	3,179 3,300 3,664 4,179	3,083 3,361 3,619 4,137	3,670 3,810 4,230 4,820	3,560 3,880 4,180 4,770 	4,480 4,650 5,160 5,890	4,350 4,740 5,100 5,830
ss Road Basel se Road South rn Avenue Broad  1st Avenue 51st A	line Road nern Avenue dway Road Avenue	3,300 3,664 4,179 Eastbound	3,361 3,619 4,137 ••••••••••••••••••••••••••••••••••••	3,810 4,230 4,820 Eastbound	3,880 4,180 4,770 	4,650 5,160 5,890	4,740 5,100 5,830
ne Road South rn Avenue Broad Ist Avenue 51st A	dway Road  Avenue	3,664 4,179 Eastbound	3,619 4,137 Westbound	4,230 4,820 Eastbound	4,180 4,770 Westbound	5,160 5,890	5,100 5,830
Ist Avenue Broad	dway Road	4,179 Eastbound	4,137 Westbound	4,820 Eastbound	4,770 Westbound	5,890	5,830
1st Avenue 51st A	Avenue	Eastbound	Westbound	Eastbound	Westbound		
			Actual and and annual Constitution of Course and Additional Constitution of Co	TORUS TO A STATE OF THE PROPERTY OF THE STATE OF THE STAT	And the graph of the first for the form of the first of the second section of the sectio	Eastbound	Westbound
		115	115				
ienue E of 6			113	140	140	180	180
venue E oi :	S1st Avenue	390	390	470	470	590	590
1st Avenue 51st A	Avenue	515	515	620	620	780	780
venue E of 5	51st Avenue	155	155	190	190	240	240
1st Avenue 51st A	Avenue	200	200	240	240	300	300
venue E of 5	51st Avenue	350	350	420	420	530	530
venue 59th	Avenue	184	146	220	180	280	220
venue 51st A	Avenue	1,218	1,112	1,450	1,320	1,830	1,670
venue 59th	Avenue	469	533	560	640	710	800
venue 51st A	Avenue	2,216	2,478	2,630	2,940	3,320	3,710
venue 59th	Avenue	•	1	-		2,870	2,890
venue 51st A	Avenue					3,120	3,730
venue 59th	Avenue	942	1,120	1,120	1,330	1,410	1,680
ve ve ve ve	nue E of : nue 59th nue 51st / nue 59th nue 59th nue 59th nue 51st / nue 59th	nue E of 51st Avenue nue 59th Avenue enue 51st Avenue nue 59th Avenue nue 59th Avenue nue 51st Avenue nue 59th Avenue 51st Avenue	nue       E of 51st Avenue       350         nue       59th Avenue       184         nue       51st Avenue       1,218         nue       59th Avenue       469         nue       51st Avenue       2,216         nue       59th Avenue       1,915         enue       51st Avenue       2,080	nue     E of 51st Avenue     350     350       nue     59th Avenue     184     146       nue     51st Avenue     1,218     1,112       nue     59th Avenue     469     533       enue     51st Avenue     2,216     2,478       nue     59th Avenue     1,915     1,931       enue     51st Avenue     2,080     2,488	nue         E of 51st Avenue         350         350         420           nue         59th Avenue         184         146         220           nue         51st Avenue         1,218         1,112         1,450           nue         59th Avenue         469         533         560           nue         51st Avenue         2,216         2,478         2,630           nue         59th Avenue         1,915         1,931         2,280           nue         51st Avenue         2,080         2,488         2,470	nue         E of 51st Avenue         350         350         420         420           nue         59th Avenue         184         146         220         180           nue         51st Avenue         1,218         1,112         1,450         1,320           nue         59th Avenue         469         533         560         640           nue         51st Avenue         2,216         2,478         2,630         2,940           nue         59th Avenue         1,915         1,931         2,280         2,300           enue         51st Avenue         2,080         2,488         2,470         2,960	nue         E of 51st Avenue         350         350         420         420         530           nue         59th Avenue         184         146         220         180         280           nue         51st Avenue         1,218         1,112         1,450         1,320         1,830           nue         59th Avenue         469         533         560         640         710           nue         51st Avenue         2,216         2,478         2,630         2,940         3,320           nue         59th Avenue         1,915         1,931         2,280         2,300         2,870           nue         51st Avenue         2,080         2,488         2,470         2,960         3,120

Peak Season Daily Traffic Volumes - Includes Casino Traffic

Roadway	From	To	. Casino Dail	/Volume	1997 Pk Season	Daily Volume	2000 Pk Season	Daily Volume	2005 Pk Season I	Daily Volume
North/South Counts			* Northbound	Southbound	Northbound		Northbound	Southbound :	Northbound	Southbound
51st Avenue	S. of Pecos Rd	Pecos Road	230	230	2,905	2,905	3,320	3,320	4,000	4,000
51st Avenue	Pecos Road	Casino Entrance	· 340	340	3,335	3,335	3,800	3,800	4,560	4,560
51st Avenue	Casino Entrance	Estrella Drive	1,930	1,930	4,685	4,715	5,110	5,140	5,810	5,850
51st Avenue	Estrella Drive	Dobbins Road	1,930	1,930	5,110	5,015	5,600	5,490	6,410	6,280
51st Avenue	Dobbins Road	Baseline Road	1,815	1,815	5,115	5,180	5,625	5,695	6,465	6,555
51st Avenue	Baseline Road	Southern Avenue	1,645	1,645	5,310	5,265	5,875	5,825	6,805	6,745
51st Avenue	Southern Avenue	Broadway Road	1,530	1,530	5,710	5,670	6,350	6,300	7,420	7,360
					,					
East/West Counts	THAT SHARES		Eastbound	Westbound	# Bastbound ##	Westbound	Eastbound	- Westbound	Eastbound	Westbound
Pecos Road	W of 51st Avenue	51st Avenue	57	- 56	175	175	200	200	240	240
Pecos Road	51st Avenue	E of 51st Avenue	56	57	450	450	530	530	650	650
St Johns Road	W of 51st Avenue	51st Avenue	0	0	515	515	620	620	780	780
Dusty Lane	51st Avenue	E of 51st Avenue	0	0	155	155	190	190	240	240
Estrella Drive	W of 51st Avenue	51st Avenue	0	0	200	200	240	240	300	300
Estrella Drive	51st Avenue	E of 51st Avenue	0 .	0	. 350	350	420	420	530	530
Elliot Road	51st Avenue	59th Avenue	0	0	185	150	220	180	280	220
Dobbins Road	43rd Avenue	51st Avenue	60	60	1,280	1,175	1,510	1,380	1,890	1,730
Dobbins Road	51st Avenue	59th Avenue	60	60	530	595	620	700	770	860
Baseline Road	43rd Avenue	51st Avenue	115	115	2,335	2,595	2,745	3,055	3,435	3,825
Baseline Road	51st Avenue	59th Avenue	60	60	1,975	1,995	2,340	2,360	2,930	2,950
Southern Avenue	43rd Avenue	51st Avenue	60	60	2,140	2,550	2,530	3,020	3,180	3,790
Southern Avenue	51st Avenue	59th Avenue	60	60	1,005	1,180	1,180	1,390	1,470	1,740

EMME2 Traffic Model Projections - 2010 Daily Traffic Volumes

Roadway	From	To all all all all all all all all all al	THE PERSONAL PROPERTY.	- Without Ca	sino Traffic 🖫 🐇	Waller St. Carlotte	PERCENT AND PROPERTY.	With Cas	no Traffic	
To a particulation			2010 Daily Vol	ıme w/ bridge 🐃	2010 Daily Vol	ume w/o bridge 🐭	2010 Daily Vol	ume w/ bridge	2010 Daily Vol	ume w/o bridge
North/South Projec	tions 22		Northbound :::	Southbound	Northbound 🙏	Southbound	Northbound	Southbound	Northbound	Southbound
51st Avenue	S. of Pecos Rd	Pecos Road	3,891	3,326	3,699	3,100	4,125	3,560	6,605	6,005
51st Avenue	Pecos Road	Casino Entrance	6,230	5,666	6,909	5,470	6,570	6,010	10,245	8,805
51st Avenue	Casino Entrance	Estrella Drive	10,261	8,833	14,707	14,038	12,195	10,765	19,395	18,755
51st Avenue	Estrella Drive	Dobbins Road .	5,807	4,799	14,151	13,512	7,740	6,730	19,265	18,530
51st Avenue	Dobbins Road	Baseline Road	6,977	5,708	10,798	10,918	8,795	7,525	15,915	16,100
51st Avenue	Baseline Road	Southern Avenue	9,275	9,083	11,935	12,734	10,920	10,730	17,245	18,000
51st Avenue	Southern Avenue	Broadway Road	7,879	7,506	12,994	13,739	9,410	9,040	18,705	19,410
East/West Projection	ns ( ) and a linear		Eastbound	Westbound 🧽	Eastbound :	Westbound	Eastbound	Westbound 🚣	Eastbound	Westbound
Estrella Drive	51st Avenue	E of 51st Avenue	1,587	1,445	2,561	2,422	1,590	1,445	2,915	2,775
Elliot Road	51st Avenue	59th Avenue	955	958	872	862	955	960	1,060	1,015
Dobbins Road	43rd Avenue	51st Avenue	4,201	4,051	4,321	3,593	4,265	4,115	5,605	4,770
Dobbins Road	51st Avenue	59th Avenue	1,099	1,073	1,038	1,027	1,160	1,135	1,570	1,625
Baseline Road	43rd Avenue	51st Avenue	4,705	3,280	2,792	1,791	4,820	3,395	5,130	4,390
Baseline Road	51st Avenue	59th Avenue	1,720	1,483	1,676	1,640	1,780	1,545	3,655	3,635
Southern Avenue	43rd Avenue	51st Avenue	5,017	4,648	5,869	5,190	5,080	4,710	8,010	7,740
Southern Avenue	51st Avenue	59th Avenue	6,226	5,572	5,768	5,014	6,290	5,635	6,775	6,195

Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... PE51\_97A.HC0

Streets: (N-S) 51st Avenue

(E-W) Pecos Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

# Two-way Stop-controlled Intersection

========					CIOII							
· · · · · · · · · · · · · · · · · · ·	Nor L	thbou	nd R	Sou L	thbou T	nd R	==== Ea L	==== stbou T	nd R	Wes	===== tboun T	:==== id .R
No. Lanes Stop/Yield	0>	1<	0 N	0>	1<	0 N	0>	1<	0	0>	1<	0
Volumes PHF Grade MC's (%)	.95 .0	215 .95 0	10 .95	10 .95	250 .95 0	. 95	10 .95	0 .95 0	0 . 95	.95	0 .95 0	20 .95
SU/RV's (%) CV's (%) PCE's	0 0 1.1	0 0 1.1	0 0 1.1	0 0 0 1.1	0 0 0	0 0 0	0 0 0 1.1	0 0 0	0 0 0 1.1	0 0 0	0 0 0	0 0 0
	· ·				- <b></b>				<u> </u>	T + T	T • T	Τ.Ι

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	220 1071 1071 0.98	252 1032 1032 1.00
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	225 1339 1339 0.99 1700 1700	255 1296 1296 1.00 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	490 603 0.98 593 1.00	492 602 0.98 592 1.00
Step 4: LT from Minor Street		EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	488 552	498 545
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.98 0.99	0.98 0.99
due to Impeding Movements Movement Capacity: (pcph)	0.99 545	0.97 527
· · · · · · · · · · · · · · · · · · ·		

Center For Microcomputers In Transportation	
HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	cal	LOS	Delay By App
EB WB	L L	12 6	527 545	>	527	>	7.0	> B	
WB	R	23	1071	>	893	>	4.2	A >	4.2
NB SB	L L	6 12	1296 1339			2.8		A A	0.1

Intersection Delay = 0.4

Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... PE51 97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Pecos Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis......... 7/16/97 Other Information....... 1997 PM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

		====:	=====	====	=====	=====	=====	====	====	=====	====	====
	Nor	thbou	nd	Sou	thbou	nd	Ea	stbou:	nd	Wes	tboun	d
	L	T 	R	L	T	R	L	T	R	L	T	R
No. Lanes Stop/Yield	0>	1<	0 N	0 >	1<	0 N	0>	1<	0	0>	1<	0
Volumes	5	260	10	15	300	5	15	5	5	15	5	35
PHF Grade	.95	.95 0	.95	. 95	.95 0	. 95	. 95	.95 0	.95	.95	.95 0	. 95
MC's (%)	0	0	0	0	0	0	0	0	0	0	Ö	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1 	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road Left Turn Minor Road	6.00 6.50	3.30

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	265 1016 1016 0.96	302 973 973 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	270 1275 1275 0.99 1700 1700	305 1227 1227 1.00 1700
of Queue-free State:	0.98	0.99
Step 3: TH from Minor Street	wB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	590 535	592 533
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.98 522 0.99	0.98 520 0.99
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	592 481	608 471
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.97 0.97	0.97 0.97
due to Impeding Movements Movement Capacity: (pcph)	0.97 465	0.93 440

	Cente	r For	Microco	mputers	In	Transportation	
HCS:	Unsignalized	Inters	section	Releas	se 2	2.1	Page 3
****	*****	****	*****	*****	***	*****	*****

Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
EB EB EB	L T R	18 6 6	440 520 973	> > >	512	> > >	7.5	> > B >	7.5
WB WB	L T R	18 6 41	465 522 1016	> > >	718	> >	5.5	> > B >	5.5
NB SB	L L	6 18	1227 1275			2.9 2.9		A A	0.1 0.1

Intersection Delay = 0.8

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 \*

File Name ..... SJ51\_97A.HC0

Streets: (N-S) 51st Avenue

(E-W) St. Johns Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis.......... 7/16/97
Other Information......... 1997 AM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

,	Nor	thbou	nd	Sou	thbour.	nd	Eas	tbound	d	West	bound	
:	L	Т	R	L	Т	R	· L	${f T}$	R	L	T	R
No. Lanes	0>	1	0	0	1<	0	1>	0<	0	0	0	0
Stop/Yield			N			N			1			*
Volumes	10	250			260	20	35		15			
PHF	. 95	. 95			.95	.95	.95		. 95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0	•	0			
SU/RV's (%)	0	0			0	0	0		0			
CV's (%)	0	0			0	0	0		0			
PCE's	1.1	1.1		,	1.1	1.1	1.1		1.1			

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

# 

Step 1: RT from Minor Street	 W	B -	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:			270 1010 1010 0.98
Step 2: LT from Major Street	S	В	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:			280 1261 1261 0.99 1700
Step 4: LT from Minor Street	 W	 В	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH			530 522
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor			0.99
due to Impeding Movements Movement Capacity: (pcph)	·	· · · · · :	0.99

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HCS: Unsignalized Intersection Release 2.1	Page 3
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Movement				SharedCap Csh(pcph)	Avg.Tot	al	LOS	Delay By App
EB L	41	516	>	607	>	6.6	> B	6.6
EB R	18	1010	>		>	0.0	>	0.0
NB L	12	1261			2.9		A	0.1

Intersection Delay = 0.6

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... SJ51 97P.HC0

Streets: (N-S) 51st Avenue

(E-W) St. Johns Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

### Two-way Stop-controlled Intersection

	Nor	thbour	nd	Sou	thbour	nd	Eas	tboun	.d	West	bound	
	L	${f T}$	R	L	T	R	$\mathbf L$	T	R	L	T	R
No. Lanes	0>	 1		0	1<	0	1.					
Stop/Yield	0/	<u>.</u>	N	U	1<	N	1>	0<	0	0	0	0
Volumes	10	300			315	20	35		15			
PHF	.95	. 95			.95	.95	.95		.95			
Grade		0	- 1		0			0			0	
MC's (%)	0	0			0	0	0	_	0		Ü	
SU/RV's (%)	0	0	ļ		0	0	0		0			
CV's (%)	0	0	]		0	0	0		ol			
PCE's	1.1	1.1	ĺ		1.1	1.1	1.1		1.1			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Roa	d 6.00	3.30
Left Turn Minor Road	6.50	3.40

# 

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		325 948 948 0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	· · · · · · · · · · · · · · · · · · ·	335 1187 1187 0.99 1700
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		635 454
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.99 0.99
due to Impeding Movements Movement Capacity: (pcph)		0.99 448

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HCS:	Unsignalized Intersec	tion Release 2	2.1	Page 3
****	*****	*****	*****	*****

Movement			SharedCap Csh(pcph)		LOS	Delay By App
EB L	41	448	> 534	> 7.6	> R	7.6
EB R	18	948		>	>	
NB L	12	1187		3.1	A	0.1

Intersection Delay = 0.6

### Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... CS51\_97A.HC0

Streets: (N-S) 51st Avenue

(E-W) Casino Entrance

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael Date of Analysis..... 7/16/97

Other Information...... 1997 AM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

			=====	=====	=====	====	=====	=====	====	======	====	=====
	Nor	thbou	nd	Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1<	0	1	1	0	0	0	0	1	0	1
Stop/Yield Volumes		260	N	100	105	N				0.0		
PHF		260 .95	20 .95	120 .95	195	-				20		85
Grade		.95	.95	.95	.95 0			0		.95	0	.95
MC's (%)		0	0	0	0	Ì	•	·	Ì	Λ	U	0
SU/RV's (%)		o O	o l	0	0					0		0
CV's (%)		Ō	0	0	Ö					0		0
PCE's		1.1	1.1	1.1	1.1	.				1.1		1.1
		. <b></b>										

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## 

Step 1: RT from Minor Street	. WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	270 1010 1010 0.90	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	280 1261 1261 0.89	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	585 485	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.89	
due to Impeding Movements Movement Capacity: (pcph)	0.89 432	

Center For	Microcomputers In	Transportation	
HCS: Unsignalized Inters	section Release	2.1 P	age, 3
********	*******	******	****

Movement			-	Avg.Total . Delay	LOS	Delay By App
WB L	23	432		8.8	В	
WB R	98	1010		3.9	A	5.3
SB L	139	1261		3.2	A	1.1

Intersection Delay = 1.3

### Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 \*

File Name ..... CS51 97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Casino Entrance

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis.......... 7/16/97
Other Information......... 1997 PM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

	Northbound		nd	Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	Т	R	L	T	R
No. Lanes Stop/Yield	0	1<	0	1	1	0	0	0	0	1	0	1
Volumes		265	N 30	175	260	N		•		30		175
PHF		.95	.95	.95	.95	1			1	. 95		.95
Grade		0	.		0			0			0	
MC's (%)		0	0	0	0					0		0
SU/RV's (%)		0 .	0	0	0					0		0
CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1				i	1.1		1.1

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 2
***	*****************	

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	280 999 999 0.80	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	295 1240 1240 0.84	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	715 408	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.84 0.84	
due to Impeding Movements Movement Capacity: (pcph)	0.84 342	

	Center F	or Microcomp	uters In Tra	ansportation	
HCS:	Unsignalized Int	ersection	Release 2.1	•	Page 3
****	* * * * * * * * * * * * * * * * * *	*****	*****	******	*****

			Avg.Total Delay	LOS	Delay By App
35	342		11.7	C	
202	999		4.5	A	5.3
202	1240	•	3.5	A	1.3
	v (pcph)  35 202	v(pcph) Cm(pcph) 35 342 202 999	v(pcph) Cm(pcph) Csh(pcph) 35 342 202 999	v(pcph)       Cm(pcph)       Csh(pcph)       Delay         35       342       11.7         202       999       4.5	v(pcph)       Cm(pcph)       Csh(pcph)       Delay       LOS         35       342       11.7       C         202       999       4.5       A

Intersection Delay = 1.8

Center For Microcomputers In Transportation

File Name ..... DU51\_97A.HC0

Streets: (N-S) 51st Avenue

(E-W) Dusty Lane

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 1997 AM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

	Northbound		Southbound			Eastbound			Westbound			
	L	T	R	L	Т	R	L	T	R	L	Т	.R
No. Lanes	0	1<	0	0 >	1	0	0	0	0	1>	0<	0
Stop/Yield			N			N						
Volumes		355	15	20	305				•	10		15
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0		0
SU/RV's (%)		0	0	0	0					0		0
CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

# 

	(	
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	362 908 908 0.98	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	370 1142 1142 0.98 1700	
of Queue-free State:	0.97	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	688 423	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.97 0.97	
due to Impeding Movements Movement Capacity: (pcph)	0.97 412	· ·

	Cente	er For Microco	omputers In Transpo:	ctation
HCS:	Unsignalized	Intersection	Release 2.1	Page 3
****	******	******	******	******

Movement				SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
WB L	12	412	>	613	>	6.2	> R	6.2
WB R	18	908	>	015	>	0.2	>	0.2
SB L	23	1142			3.2		A	0.2

Intersection Delay = 0.3

Center For Microcomputers In Transportation

File Name ...... DU51\_97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Dusty Lane

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 1997 PM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

	Northbound			Sou	thbou	nd	Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	Т	R
No. Lanes	0	1<	0	0>	1	0	0	0	0	1>	0<	0
Stop/Yield Volumes		420	N 15	20	425	N				10		15
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0			0			0	_
MC's (%)		0 0	0	0	0					0		0
SU/RV's (%) CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor R	oad 6.00	3.30
Left Turn Minor Road	6.50	3.40

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·		
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	428 840 840 0.98	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	435 1064 1064 0.98 1700	
of Queue-free State:	0.97	·
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	872 331	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.97	
due to Impeding Movements Movement Capacity: (pcph)	0.97 321	

Center For Microcom	puters In Transportation	
HCS: Unsignalized Intersection	Release 2.1 Page 3	
**********	********	

Move	ment			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB :	 L	12	321		. >	> 7	
WB 1	R	18	840	510	7.5 >	> B	7.5
SB :	L	23	1064		3.5	A	0.1
		In	tersectio	on Delay =	0.3		

File Name ..... ES51 97A.HC0

Streets: (N-S) 51st Avenue

(E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 1997 AM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

~				-====	=====	====	=====:	====	=====	=====	====	=====
,	Nor	thbou	nd	Sou	Southbound		Eas	stbou	nd	Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0 >	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N J			N						
Volumes	10	350	10	15	315	10	20	0	5	5	0	35
PHF	.95	. 95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0	1		0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
											_	

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	355 915 915 0.96	320 953 953 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	360 1155 1155 0.98 1700 1700	325 1200 1200 0.99 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	705 465	705 465
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.97 450 1.00	0.97 450 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	702 415	718 406
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.97 0.97	0.97 0.97
due to Impeding Movements Movement Capacity: (pcph)	0.97 402	0.93

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)	MoveCa Cm(pcp		SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
EB	L	23	378	>	430	>		>	
EB	R	6	953	>	432	>	8.9	B >	8.9
WB	L	6	402	>		>		>	
WB	R	41	915	>	787	>	4.9	A >	4.9
NB SB	L L	12 18	1200 1155			3.0 3.2		A A	0.1

Intersection Delay = 0.6

HCS: Unsignalized Intersection Release 2.1

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... ES51\_97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 1997 PM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

	Nor	thbour	nd	Sou	thbour	nd	Ea	stbou	nd	Wes	tbound	d
	L	T	R	L	Т	R	$\Gamma$	T	R	L	$\mathbf{T}$	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0 >	1<	0
Stop/Yield			N			N						
Volumes	10	425	10	15	450	10	20	0	5	5	0	35
PHF	. 95	.95	.95	.95	.95	.95	. 95	.95	. 95	.95	. 95	.95
Grade		0			0	Ì		0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	ЕВ
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	430 838 838 0.95	455 814 814 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	435 1064 1064 0.98 1700 1700	460 1035 1035 0.99 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	915 361	915 361
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.96 346 1.00	0.96 346 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	912 314	928 307
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.96 0.97	0.96 0.97
due to Impeding Movements Movement Capacity: (pcph)	0.96 302	0.92

	Center For	Microcomputers	In Transp	ortation
HCS: Unsigna	lized Inter	section Relea	se 2.1	Page 3
******	******	******	******	*****

Mov	ement	FlowRate v(pcph)	MoveCap Cm(pcp)		SharedCap Csh(pcph)	Avg.To Delay	tal	LOS	Delay By App
EB	L	23	283	>	327	>	12.1	>	12.1
EB	R	6	814	>	527	>	12.1	>	12.1
WB	L	6	302	>	683	>	5.7	> B	5.7
WB	R	41	838	>		>	3,,	>	3.,
NB SB	L L	12 18	1035 1064			3.5 3.4		A A	0.1 0.1

Intersection Delay = 0.6

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... EL51 97A.HC0

Streets: (N-S) 51st Avenue

(E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 Peak Season - (7-9:00 AM) with Casino

## Two-way Stop-controlled Intersection

=========	=====	=====	====	=====	=====	====	====	<b>===</b> =:	====	=====	====:	====
	Northbound		Sou	Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	Т	R
No. Lanes	0>	1<	i i	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield Volumes	5	370	N 5	0	315	N 5	5	5	10	5	5	5
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0	1		0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	. 0	0	0	0	0	0	0	0	0	.0	0	0
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	- <b></b>				<b></b>							

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	372 897 897 0.99	318 955 955 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	375 1136 1136 1.00 1700 1700	320 1207 1207 0.99 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph)	698 469 0.99 465	698 469 0.99 465
Prob. of Queue-free State:	0.98	0.98
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	702 415	700 416
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.98 0.98	0.98
due to Impeding Movements Movement Capacity: (pcph)	0.97 403	0.97 406

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.To Delay	tal	LOS	Delay By App
EB EB EB	L T R	7 7 12	406 465 955	> >	580	> >	6.5	> > B >	6.5
WB WB WB	L T R	. 7 7 7		> >	522	> > >	7.2	> B > B	7.2
NB	L	7	1207			3.0		A	0.0

Intersection Delay = 0.3

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... EL51 97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 Peak Season - (4-6:00 PM) with Casino

## Two-way Stop-controlled Intersection

========	=====	=====	====	=====	=====	====	=====	====	====	=====	=====	====	
	Northbound			Sou	Southbound			Eastbound			Westbound		
	L	T	R	L	${f T}$	R	L	T	R	L	$\mathbf{T}$	R	
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0	
Stop/Yield			N			N			_			_	
Volumes	10	410	0	5	480	5	0	5	10	0	0	5	
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	
Grade		0			0	[		0	- 1		0		
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	

Vehicle		Critical	Follow-up
Maneuver		Gap (tg)	Time (tf)
Left Turn Major Road	Road	5.00	2.10
Right Turn Minor Road		5.50	2.60
Through Traffic Minor		6.00	3.30
Left Turn Minor Road		6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	410 858 858 0.99	482 789 789 0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	410 1093 1093 0.99 1700 1700	485 1007 1007 0.99 1700 1700
of Queue-free State:	0.99	0.98
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	910 363	908 364
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.97 353 1.00	•
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	915 313	910 315
Impedance Factor: Adjusted Impedance Factor:	0.95 0.96	0.97 0.98
Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph)	0.95 297	0.97

	Center For	Microcomputers	In	Transportation	
HCS:	Unsignalized Inter	section Releas	se 2	2.1	Page 3
***	· * * * * * * * * * * * * * * * * * * *	*****	***	*********	*****

Mov	ement				SharedCap Csh(pcph)		al	LOS	Delay By App
EB	${f T}$	7	354	>		. >		>	6.9
EB	R	12	789	>	543	>	6.9	> B	
WB	R	7	858	>	858	>	4.2	> A	
NB SB	L L	12 7	1007 1093		. ,	3.6 3.3		A A	0.1

Intersection Delay = 0.2

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... DO51 97A.HC0

Streets: (N-S) 51st Avenue (E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 AM Peak Hour-Pk Season-Existing Geometry

## All-way Stop-controlled Intersection

	=====	=====	====	=====	=====	====	=====	=====	====	=====	=====	=====
	Northbound		Southbound			Eastbound			Westbound			
	L	T	R	L	T	R	L	${f T}$	R	L	T	R
No. Lanes	1	1<	0	1	1<	0	0 >	1<	0	0 >	1<	0
Volumes	15	310	55	35	280	5	15	45	15	50	35	50
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0	1		0			0			0	
MC's (%)	0	0	0	0	0	0	. 0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	13	13	.13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Analy	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate	17 62 427	39 6 360	17 17 85	56 56 151
Proportion LT Proportion RT Opposing Approach Flow Rate	0.04 0.15 360	0.11 0.02 427		0.37 0.37 85
Conflicting Approaches Flow Rate Proportion, Subject Approach Flow Rate	236 0.42 0.35	236 0.35	787	787 0.15
Proportion, Opposing Approach Flow Rate Lanes on Subject Approach Lanes on Opposing Approach	2 2	2 2	1 1	1
LT, Opposing Approach RT, Opposing Approach LT, Conflicting Approaches	39 6 73	17 62 73	56 56 56	17 17 56
RT, Conflicting Approaches Proportion LT, Opposing Approach Proportion RT, Opposing Approach	73 0.11 0.02	73 0.04 0.15		
Proportion LT, Conflicting Approaches Proportion RT, Conflicting Approaches Approach Capacity	0.31 0.31 835	0.31 0.31 861		0.07 0.09 290

## Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	427	835	0.51	7.0	В
SB	360	861	0.42	4.9	. A
EB	85	254	0.33	3.6	A
WB	151	290	0.52	7.2	В

Intersection Delay = 6.00
Level of Service (Intersection) = B

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ...... DO51 97P.HC0

Streets: (N-S) 51st Avenue (E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 PM Peak Hour-Pk Season-Existing Geometry

## All-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	${f T}$	R	L	T	R	L	T	R	$\mathbf{L}$	${f T}$	R
No. Lanes		. 1<	0	. T	1<	0	0 >	1<	0	0 >	1<	Ū
Volumes	15	370	25	30	415	10	10	30	20	35	35	30
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0	1		0			0	1		0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	- 0
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

	. <i></i>			
Volume Summary and Capacity Analy	zsis Work	Sheet		
	NB .	SB	EB	WB
LT Flow Rate	17	34	11	39
RT Flow Rate	28	11	22	34
Approach Flow Rate	461	511	67	112
Proportion LT	0.04	0.07	0.16	0.35
Proportion RT	0.06	0.02	0.33	0.30
Opposing Approach Flow Rate	511	461	112	67
Conflicting Approaches Flow Rate	179	179	972	972
Proportion, Subject Approach Flow Rate	0.40	0.44	0.06	0.10
Proportion, Opposing Approach Flow Rate	0.44	0.40	0.10	0.06
Lanes on Subject Approach	2	2	1	.1
Lanes on Opposing Approach	2	. 2	1	1
LT, Opposing Approach	34	17	39	11
RT, Opposing Approach	11	28	34	22
LT, Conflicting Approaches	50	50	51	51
RT, Conflicting Approaches	56	56	39	39
Proportion LT, Opposing Approach	0.07	0.04	0.35	0.16
Proportion RT, Opposing Approach	0.02	0.06	0.30	0.33
Proportion LT, Conflicting Approaches	0.28	0.28	0.05	0.05
Proportion RT, Conflicting Approaches	0.31	0.31	0.04	0.04
Approach Capacity	906	935	179	251

	Center	For	Microcomp	outers	In	Transportation	
HCS:	Unsignalized I	nters	section -	Releas	e 2	2.1	Page 3
****	*****	****	******	****	***	**********	****

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
			<del></del>		
NB	461	906	0.51	6.9	В
SB	511	935	0.55	8.0	В
EB	67	179	0.37	4.2	A
WB	112	251	0.45	5.5	В

Intersection Delay = 7.08
Level of Service (Intersection) = B

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... BA51\_97A.HC0

Streets: (N-S) 51st Avenue (E-W) Baseline Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 Peak Season - (7-9:00 AM) with Casino

## All-way Stop-controlled Intersection

	Northbound		Sou	Southbound		Eastbound			Westbound			
	L	${f T}$	R	· L	${f T}$	R	${f L}$	Т	R	L	${f T}$	R
No. Lanes	1	1<	0	1	1<	0	1	1<	0	1	1<	0
Volumes	30	350	60	75	275	30	35	120	40	35	70	50
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade	•	0	İ		0	1		0			. 0	•
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	0	. 0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Anal	 veie Work	 Sheet		
VOITIME Summary and Capacity Anal	ys15 WOIR			
	NB	SB	EB	WB
LT Flow Rate	34	84	39	39
RT Flow Rate	67	34	45	56
Approach Flow Rate	494	427	219	174
Proportion LT	0.07	0.20	0.18	0.22
Proportion RT	0.14	0.08	0.21	0.32
Opposing Approach Flow Rate	427	494	174	219
Conflicting Approaches Flow Rate	393	393	921	921
Proportion, Subject Approach Flow Rate	0.38	0.32	0.17	0.13
Proportion, Opposing Approach Flow Rate	0.32	0.38	0.13	0.17
Lanes on Subject Approach	2	2	2	·2
Lanes on Opposing Approach	2	2	2	2
LT, Opposing Approach	84	34	. 39	39
RT, Opposing Approach	34	67	56	45
LT, Conflicting Approaches	78	78	118	118
RT, Conflicting Approaches	101	101	101	101
Proportion LT, Opposing Approach	0.20	0.07		0.18
Proportion RT, Opposing Approach	0.08	0.14		0.21
Proportion LT, Conflicting Approaches	0.20	0.20	0.13	0.13
Proportion RT, Conflicting Approaches	0.26	0.26	0.11	0.11
Approach Capacity	778	812	451	431

Center For Microcomputers In Transportation	<u>l</u>
HCS: Unsignalized Intersection Release 2.1	Page 3
************	****

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	494	778	0.64	11.2	С
SB	427	812	0.53	7.4	B
EB	219	451	0.49	6.3	В
WB	174	431	0.40	4.6	A

Intersection Delay = 8.26
Level of Service (Intersection) = B

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... BA51 97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Baseline Road

Analyst..... Kirkham Michael

Date of Analysis...... 6/23/97 Other Information...... 1997 Peak Season - (4-6:00 PM) with Casino

## All-way Stop-controlled Intersection

	Northbound		nd	Sou	Southbound		Eastbound			Westbound		
ı	L	$^{-1}\mathbf{T}$	R	L	${f T}$	R	L	- T	R	L	T	, R
i												
No. Lanes	1	1<	0	1	1<	0	1	1<	0	1	1<	<u>,</u> O
Volumes	30	365	45	75	410	60	35	80	45	50	110	60
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
										<b>-</b>		

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate Proportion LT Proportion RT Opposing Approach Flow Rate Conflicting Approaches Flow Rate Proportion, Subject Approach Flow Rate Proportion, Opposing Approach Flow Rate Lanes on Subject Approach Lanes on Opposing Approach LT, Opposing Approach RT, Opposing Approach	34 51 495 0.07 0.10 612 427 0.32 0.40 2 284 67	84 67 612 0.14 0.11 495 427 0.40 0.32 2 34 51	39 51 180 0.22 0.28 247 1107 0.12	56 67 247 0.23 0.27 180 1107
LT, Conflicting Approaches RT, Conflicting Approaches Proportion LT, Opposing Approach	95 118 0.14	95 118 0.07		118 118 0.22
Proportion RT, Opposing Approach Proportion LT, Conflicting Approaches Proportion RT, Conflicting Approaches	0.11 0.22 0.28	0.10 0.22 0.28	0.27 0.11 0.11	0.28 0.11 0.11
Approach Capacity	799	841	416	435

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
****	* * * * * * * * * * * * * * * * * * * *	****

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	495	799	0.62	10.5	С
SB	612	841	0.73	15.9	C
EB	*	*	*	*	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the  $\mbox{maximum}$ .

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 07-17-1997 Kirkham, Michael & Associates

(N-S) 51st Avenue Streets: (E-W) Southern Avenue

Analyst: Kirkham Michael File Name: SO51\_97A.HC9
Area Type: Other 6-23-97 AM Peak

6-23-97 AM Peak Area Type: Other Comment: 1997 Pk Season with Casino-Existing Geometry

Cycle Length: 90 secs Phase combination order: #1 #5

						<i>-</i>		-			
,	East	bound	We	stbour	nd	No:	rthbo	und	Soi	uthbou	und
	L 7		L	T	R	L	T	R	L	T	R
No. Lanes Volumes Lane Width RTOR Vols Lost Time	12.0 12	75 10 2.0 0.00 3.00	12.0	35 12.0	0	12.0	365 12.0	0	12.0	1 325 12.0	0
Signal Operations											
Phase Combin		L 2	3	4	4	T 0 = 1		5 *	6	7	8
EB Left Thru		<b>,</b>			NB	Left Thr	_	^ *			
Right		· k			1	Rig		*			
Peds	+	t				Ped		*			
WB Left	,	<b>t</b>			SB	Left		*			
Thru		ŧ				Thr		*			
Right		<b>k</b> 				Rig		* *			
Peds NB Right	. 7	ŧ			EB	Ped: Rigi		*			
SB Right				*	WB						
Green	30.0	DΑ			1	een	52.	0A			
Yellow/AR	4.0				Ye.	11ow/	AR 4.	0			

			Intersect	ion Perfo		Summary	•		7
	Lane	Group:	Adj Sat	v/c	g/C			Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
	·			~					
EB	L	397	1154	0.055	0.344	12.7	В	13.2	В
	TR	569	1651	0.167	0.344	13.3	В		
WB	L	422	1226	0.052	0.344	12.7	В	13.4	В
	TR	523	1517	0.214	0.344	13.5	В		
NB	L	356	605	0.031	0.589	5.0	Α	6.8	В
	TR	983	1669	0.440	0.589	6.8	B		
SB	L	282	479	0.457	0.589	7.6	В	6.7	В
	T	990	1681	0.369	0.589	6.4	В		
	R	842	1429	0.013	0.589	5.0	A		
			ersection :				ersect	tion LOS	= B
Lost	Lost Time/Cycle, $L = 6.0$ sec Critical $v/c(x) = 0.368$								

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 07-17-1997

Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue

Analyst: Kirkham Michael

(N-S) 51st Avenue File Name: SO51\_97P.HC9 6-23-97 PM Peak Area Type: Other Comment: 1997 Pk Season with Casino-Existing Geometry

========	========	=======	=======	======		=======	=====
	Eastbou	nd   W	estbound	No	rthbound	Southbo	und
	L T	R L	T R	L	T R	L T	R
			<b>-</b>				
No. Lanes	1 1 <	1	1 <	1	1 <	1 1	1
Volumes	20 40	15 3	5 115	90 15	390 25	90 475	20
Lane Width	12.0 12.0	12.	0 12.0	12.0	12.0	12.0 12.0	12.0
RTOR Vols		0		0	0		0
Lost Time	3.00 3.00	3.00 3.0	0 3.00 3.	00 3.00	3.00 3.00	3.00 3.00	3.00
				<del></del>			
			nal Opera	tions			,
Phase Combi		2	3 4		5	6 7	8
EB Left	*		[]	NB Lef			
Thru	*			Thr			
Right	*			Rig			
Peds	*			Ped			
WB Left	*	٠		SB Lef			
Thru	*			Thr			
Right	*			Rig			
Peds	*			Ped			
NB Right			i i	EB Rig			
SB Right				WB Rig			
Green	30.0A		l l	Green	52.0A		
Yellow/AR	4.0	<b>*</b> 1		Yellow/			
Cycle Lengt	h: 90 secs	Phase	combinati	on orde:	r: #1 #5		

			Intersect:	ion Derfo	rmange	Silmmaria			
	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C		LOS	Approac Delay	ch: LOS
					0 244	10.0		10.0	
EB	L	270	784	0.081	0.344	12.9	В	12.9	В
•	TR	581	1688	0.107	0.344	13.0	В		
WB	L	484	1406	0.081	0.344	12.9	В	14.5	В
	TR	566	1643	0.406	0.344	14.8	В		
NB	L	197	335	0.086	0.589	5.2	В	6.9	В
	TR	1026	1743	0.454	0.589	6.9	В		
SB	L	256	434	0.395	0.589	6.9	В	7.3	В
	${f T}$	1036	1759	0.516	0.589	7.4	В		
	R	880	1495	0.025	0.589	5.0	A		
		Int	ersection D	Delay =	8.8 se	c/veh Int	ersec	tion LOS	= B
Lost	Time/		= 6.0 se						

File Name ..... BR51 97A.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 Peak Season - (7-9:00 AM) with Casino

## Two-way Stop-controlled Intersection

· · · · · · · · · · · · · · · · · · ·	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	Т	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1<	- '	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes	30	435			385	20	50		70			
PHF	.89	.89			.89	.89	.89		.89			
Grade	}	0			0			0			0	
MC's (%)	0	0			0	0	. 0		0			
SU/RV's (%)	0	0			0	0	0		0			
CV's (%)	13	13			13	13	13		13			
PCE's	1.13	1.13			1.13	1.13	1.13		1.13			
		<b>-</b>										

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		395 873 873 0.90
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		405 1099 1099 0.97
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		860 336
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.97 0.97
due to Impeding Movements Movement Capacity: (pcph)		0.97 324

Center For Microcomputers In Transporta	tion
HCS: Unsignalized Intersection Release 2.1	Page 3
***************	*****

Mov	ement		MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	63	324		13.8	C	
EB	R	89	873		4.6	A	10.2
NB	L	38	1099		3.4	A	0.2
		Int	tersection	n Delav =	1 4		

File Name ..... BR51\_97P.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 1997 Peak Season - (4-6:00 PM) with Casino

## Two-way Stop-controlled Intersection

	l No	Northbound   Southbound				===== nd	======================================			Woot	tbound	
	L	Т	R				t		į,			
	נו		7.	L	T	R	L	${f T}$	R	L	${f T}$	R
No. Lanes	1	1	0	0	1<	- 1	1	0	1	0	0	0
Stop/Yield Volumes	40	405	N		F00	N	<b>1</b> -				. ,	
	40	485	1		580	35	15		35			
PHF Grade	.89	.89			.89	.89	.89	_	.89			
		. 0			0			0	_		0	
MC's (%)	0	0			0	0	0		0			
SU/RV's (%)	0	0			0	0	0		0			
CV's (%)	8	8			8	8	8		8			
PCE's	1.08	1.08			1.08	1.08	1.08	:	1.08			

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		598 689 689 0.94
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		615 873 873 0.94
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		1122
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.94 0.94
due to Impeding Movements Movement Capacity: (pcph)		0.94 224

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
****	* * * * * * * * * * * * * * * * * * * *	****

Mov	ement	FlowRate v(pcph)		SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	18	224		17.5	C	10.0
EB	R	42	689		5.6	В	10.2
NB	L	49	873		4.4	A	0.3
		Int	tersection	n Delay =	0.7		

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... PE51\_00A.HC0

Streets: (N-S) 51st Avenue

(E-W) Pecos Road

Major Street Direction... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

## Two-way Stop-controlled Intersection

==========	=====	====	====	=====	=====	====	=====	====	====	====-		
	Northbound			Southbound			Ea	stbou	nd	Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes Stop/Yield	0>	1<	и 0	0>	1<	0 N	0>	1<	0	0>	1<	0
Volumes PHF	10 .95	250 .95	15	15 .95	295 .95	5	15 .95	0 .95	0 . 95	10 .95	0 . 95	25 . 95
Grade MC's (%)	0	0	0	0	0 0	o	0	0 0	0	0	0 0	0
SU/RV's (%) CV's (%)	0	0 0	0	0 0	0	0	0 0	0 0	0	0 0	0 0	0 0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	258 1025 1025 0.97	298 978 978 1.00
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	265 1282 1282 0.99 1700 1700	300 1233 1233 0.99 1700 1700
	0.98	0.99
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	582 540	588 536
due to Impeding Movements Movement Capacity: (pcph)	0.97 524	0.97 520
Prob. of Queue-free State:	1.00	1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	580 489	592 481
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.97 0.98	0.97 0.98
due to Impeding Movements Movement Capacity: (pcph)	0.98 478	0.95 457

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
***	* * * * * * * * * * * * * * * * * * * *	*****

Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot	al	LOS	Delay By App
EB WB	L L	18 12	457 478	>	457	>	8.2	> B	
WB	R	29	1025	>	768	>	5.0	A >	5.0
NB SB	L L	12 18	1233 1282			2.9		A A	0.1 0.1

Intersection Delay = 0.6

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... PE51\_00P.HC0

Streets: (N-S) 51st Avenue (E-W) Pecos Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97 Other Information........ 2000 PM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

=======================================												
	Nor	thbou	nd	Southbound			Eastbound			Westbound		
	Ъ	T	R	L	T	R	L	Т	R	L	T	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield Volumes	10	300	N 15	20	345	N 5	20	10	10	20	10	45
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	45 .95
Grade		0			0		,,,,	0	,,,,	.,,	0	. , ,
MC's (%)	0	0	0	0	0	0	0	0.	0	0	0	0
SU/RV's (%)	0	. 0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	308 967 967 0.95	348 923 923 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	315 1213 1213 0.98 1700 1700	350 1168 1168 0.99 1700 1700
Step 3: TH from Minor Street	 WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	688 475 0.96 457 0.97	692 473 0.96 455 0.97
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	695 419	712 410
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.94 0.95	0.94 0.95
due to Impeding Movements Movement Capacity: (pcph)	0.94 394	0.90

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HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.To	tal	LOS	Delay By App
EB EB EB	L T R	23 12 12	369 455 923	> > >	462	> > >	8.7	> > B >	8.7
WB WB WB	L T R	23 12 52	394 457 967	> >	629	> > >	6.6	> > B >	6.6
NB SB	L L	12 23	1168 1213			3.1 3.0		A A	0.1 0.2

Intersection Delay = 1.2

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... SJ51\_00A.HC0

Streets: (N-S) 51st Avenue (E-W) St. Johns Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information..... 2000 AM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

	=====	====	=====	====	=====:	====	======	======	====	====	=====	====
	Nor	thbou	nd	Sou	thbou	nd	Eas	tbound	'	West	bound	
	L	T	R	L	Т	R	L	${f T}$	R	L	${f T}$	R
No. Lanes	0>	1	0	0	1<	0	1>	0<	0	0	0	- <b>-</b> -
Stop/Yield			N			N				•		
Volumes	15	290	į		305	25	45	2	0			
PHF	.95	. 95	ļ		.95	. 95	.95	.9	5			-
Grade		0			0			0	ļ		0	
MC's (%)	0	0			0	0	Q		0			
SU/RV's (%)	0	0			0	0	0		0			
CV's (%)	0	0			0	0	0		0			
PCE's	1.1	1.1	}		1.1	1.1	1.1	1.	1			
			_									

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		318 955 955 0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:		330 1194 1194 0.98 1700
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		622 462
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.98 0.98
due to Impeding Movements Movement Capacity: (pcph)		0.98 453

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement			SharedCap Csh(pcph)		LOS	Delay By App
EB	T.	52	453 >		>		
22		32	133	540	7.7	В	7.7
EB	R	23	955 >		>	>	
NB	L	18	1194		3.1	A	0.1
Intersection Delay = 0.8							

HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... SJ51 00P.HC0

Streets: (N-S) 51st Avenue (E-W) St. Johns Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97 Other Information........ 2000 PM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

=========	=====	====	====	=====	=====	=====	=====	====	====	=====	=====	====
	Nor	thbou:	nd	Sou	thbour	nd	Eas	tboun	d	West	bound	Į.
·	L	T	R	L	T	R	L	T	R	L	$\mathbf{T}$	R
No. Lanes	0>	1	0	0	1<	0	1>	0<	0	0	0	0
Stop/Yield			N			N			- 1			
Volumes	15	345			360	25	45		20			
PHF	.95	.95			.95	. 95	.95		.95			
Grade		0			0			0			0	
MC's (%)	0	0			0	0	0		0			
SU/RV's (%)	0	0			0	0	0		0			
CV's (%)	0	0			0	0	0		0			
PCE's	1.1	1.1			1.1	1.1	1.1		1.1			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		372 897 897 0.97
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:		385 1124 1124 0.98 1700
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		732 399
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.98 0.98
due to Impeding Movements Movement Capacity: (pcph)		0.98 391

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HCS:	Unsignalized Inters	section Release	2.1	Page 3
****	*****	*****	*****	*****

Movement				SharedCap Csh(pcph)	Avg.Tot	al	LOS	Delay By App	
EB L	52	391	>	473	>	9.0	> B	9.0	
EB R	23	897	>		>		>	3.0	
NB L	18	1124			3.3	•	A	0.1	

Intersection Delay = 0.8

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... CS51 00A.HC0

Streets: (N-S) 51st Avenue

(E-W) Casino Entrance

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

## Two-way Stop-controlled Intersection

=========												
	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	Ļ	Т	R	L	T	R
No. Lanes Stop/Yield	0	1<	<b>N</b>	1.	1	0 N	0 .	0	0	1	0	1
Volumes PHF		300 .95	20	120 .95	225 .95					20 .95		85 .95
Grade		0			0			0	i		0	
MC's (%)		0	0	0	0	1				0		0
SU/RV's (%)		0	0	0	0	,				0		0
CV's (%) PCE's		1.1	0	1.1	0 1.1					1.1		$\frac{0}{1.1}$
									. <b></b>	<del>-</del>		

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	310 964 964 0.90	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	320 1207 1207 0.88	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	655 442	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.88	
due to Impeding Movements Movement Capacity: (pcph)	0.88 391	

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HCS:	Unsignalized Intersection Release 2.1	Page 3
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Movement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB L	23	391		9.8	В	5.3
WB R	98	964		4.2	A	<b>5.3</b>
SB L	139	1207		3.4	A	1.1

Intersection Delay = 1.2

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... CS51 00P.HC0

Streets: (N-S) 51st Avenue

(E-W) Casino Entrance

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97
Other Information............ 2000 PM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	Т	R
No. Lanes	0	1<	0	1	1	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		310	30	175	300				-	30		175
PHF		.95	.95	.95	. 95					.95		. 95
Grade		0			. 0	Ì		0	}		0	
MC's (%)		0	0	0	0	[				0		0
SU/RV's (%)		0	0	0	0	ļ				0		0
CV's (%)		0	0	0	0				1	0		0
PCE's		1.1	1.1	1.1	1.1	-				1.1		1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	ÉB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	325 948 948 0.79	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	340 1181 1181 0.83	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	800 364	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.83 0.83	
due to Impeding Movements Movement Capacity: (pcph)	0.83 302	

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HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	35	302		13.5	C	
WB	R	202	948		4.8	A	5.3
SB	L	202	1181		3.7	A	1.3
		In	tersection	n Delay =	1.7		

File Name ...... DU51\_00A.HC0

Streets: (N-S) 51st Avenue (E-W) Dusty Lane

Major Street Direction... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 2000 AM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

	Northbound		Southbound			Eastbound			Westbound			
	L	Т	R	L	T	R	L	T	R	L	T	R
No. Lanes Stop/Yield	0	1<	0 N	0>	1	0 N	0	0	0	1>	0<	0
Volumes		400	20	25	335					15		20
PHF Grade		.95 0	.95	. 95	.95	[		0		.95	•	.95
		U			0			0			0 -	
MC's (%)		0	0 }	0	0					0		0
SU/RV's (%)		0	0	0	0		-			0		0
CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

	Center	For	Microcomp	outers	In	Transportation		
HCS:	Unsignalized I						Page	2
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Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	410 858 858 0.97	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.		
of Queue-free State:	0.97 	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	770 379	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.97 0.97	
due to Impeding Movements Movement Capacity: (pcph)	0.97 366	

Center For Microcomputers In Transportation	n
HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	18	366 >	540	> 7.2	> B	7 0
WB	R	23	858 >		>	>	7.2
SB	L	29	1081		3.4	A	0.2
		In	tersectio	on Delay =	0.4		

File Name ..... DU51\_00P.HC0

Streets: (N-S) 51st Avenue (E-W) Dusty Lane

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 2000 PM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

		=====	====	=====	====	====	=====	=====	====	======	=====	====
	Nor	thbou	nd	Sou	thbou	nd	Eas	stboun	id	West!	bound	
	L	<b>T</b> .	R	L	Т	R	L	Т	R	L	T	R
No. Lanes	0	1<	0	0>	1	0	0	0	0	1>	0<	0
Stop/Yield			N			N	•		ĺ			
Volumes		465	20	25	470				ı	15		20
PHF		.95	.95	.95	.95	1			}	.95		.95
Grade		0	- 1		0	Ì		0	}		0	
MC's (%)		0	0	0	0					0		0
SU/RV's (%)		0	0	0	0					0		0
CV's (%)		0	0	0	0				1	0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

WB	EB
475 796 796 0.97	
SB	NB
485 1007 1007 0.97 1700	· · · · · · · · · · · · · · · · · · ·
0.96	
WB	EB
970 290	
0.96 0.96	
0.96 278	
	475 796 796 0.97 SB 485 1007 1007 0.97 1700 0.96 WB 970 290 0.96 0.96

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HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)		SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	18	278 >	438	> 0 1	>	0 1
WB	R	23	796 >		9.1 >	. B	9.1
SB	L	29	1007		3.7	A	0.2
		In	tersectio	n Delay =	0.4		

File Name ..... ES51\_00A.HC0

Streets: (N-S) 51st Avenue (E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 2000 AM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

			=	====:	====	=====	====	=====	=====	====:	=====
Nor	thbou	nd	Sou	thbou	nd	Ea	stbou:	nd	Wes	tbound	£
L	T	R	L	T	R	L	${f T}$	R	L	T	R
0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
		N			И					•	
15		1	20	345	15	25	0	10	10	0	45
.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
	0			0			0			0	
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	. 0	0	0
1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	L  0> 15 .95	L T	0> 1< 0 N 15 395 15 .95 .95 .95 0 0 0 0 0 0 0 0 0 0	L T R L	L T R L T  0> 1< 0 0> 1<  N  15 395 15 20 345  .95 .95 .95 .95 .95  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	L T R L T R	L T R L T R L  O> 1< 0 O> 1< 0 O>  N  15 395 15 20 345 15 25  .95 .95 .95 .95 .95 .95 .95  O O O O O O O O  O O O O O O O  O O O O O O O	L T R L T R L T  0> 1< 0 0> 1< 0 0> 1< 0 0> 1<  N N  15 395 15 20 345 15 25 0 .95 .95 .95 .95 .95 .95 .95 .95  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	L T R L T R L T R	L T R L T R L T R L T R L T R L T R L T R L T R L T R R L T R R R R	L T R L T R L T R L T R L T R L T C C C C C C C C C C C C C C C C C C

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	
		EB
Conflicting Flows: (vph)	402	352
Potential Capacity: (pcph)	866	918
Movement Capacity: (pcph)	866	918
Prob. of Queue-free State:	0.94	0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	410	360
Potential Capacity: (pcph)	1093	1155
Movement Capacity: (pcph)	1093	1155
Prob. of Queue-free State:	0.98	0.98
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-free State:	0 07	0.00
or Queue-free Blace:	0.97	0.98
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph)	798	798
Potential Capacity: (pcph)	416	416
Capacity Adjustment Factor		
due to Impeding Movements	0.95	0.95
Movement Capacity: (pcph)	396	396
Prob. of Queue-free State:	1.00	1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	795	812
Potential Capacity: (pcph)	367	359
Major LT, Minor TH		
Impedance Factor:	0.95	0.95
Adjusted Impedance Factor:	0.96	0.96
Capacity Adjustment Factor		
due to Impeding Movements	0.95	0.90
Movement Capacity: (pcph)	349	325

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HCS:	Unsignalized Intersection Release 2.1	Page 3
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Move	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
EB	L	29	325	>	401	>	10.0	> B	10.0
EB	R	12	918	>	401	>	10.0	>	10.0
WB	L	12	349	>	678	>	5.9	> B	5.9
WB	R	52	866	>	078	>	3.9	>	5.9
NB SB	L L	18 23	1155 1093			3.2 3.4		A A	0.1 0.2

Intersection Delay = 0.9

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... ES51 00P.HC0

Streets: (N-S) 51st Avenue

(E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis.......... 7/16/97
Other Information......... 2000 PM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

	=====	=====	====	=====	=====	=====	=====	====	=====	=====	====	====
	Nor	thbou	nd	Sou	thbou	nd	Ea	stbou	nd	Wes	tboun	d
	L	T	R	L	T	R	L	Т	R	L	T	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N			N						
Volumes	15	470	15	20	500	15	25	0	10	10	0	45
PHF	.95	.95	.95	.95	.95	.95	. 95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
~												

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	-EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	478 793 793 0.93	508 765 765 0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	485 1007 1007 0.98 1700 1700	515 974 974 0.98 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	1028 315 0.94 296 1.00	1028 315 0.94 296 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1025 270	1042 264
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.94 0.95	0.94 0.95
due to Impeding Movements Movement Capacity: (pcph)	0.94 253	0.89 235

Center For Microcomputers In Transportation	
HCS: Unsignalized Intersection Release 2.1	Page 3
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Move	ement	FlowRate v (pcph)	MoveCap		SharedCap Csh(pcph)	Avg.To	tal	LOS	Delay By App
EB	L	29	235	>	205	>	14.0	> ~	14.0
EB	R	12	765	>	295	>	14.2	C >	14.2
WB	Г	12	253	>	5.6.6	>		> _	<b>5</b> .0
WB	R	52	793	>	566	>	7.2	> B	7.2
NB SB	L L	18 23	974 1007			3.8 3.7		A A	0.1 0.1

Intersection Delay = 0.9

File Name ..... EL51 00A.HC0

Streets: (N-S) 51st Avenue

(E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2000 Pk Season-(7-9:00 AM) w/ Casino-Exst Geomet

#### Two-way Stop-controlled Intersection

========	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	====
	Nor	thbou:	nd	Sou	thbou	nd	Eas	stbou	nd	Wes	tboun	d
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0>	1<	0	0 >	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N			N			1			
Volumes	5	415	5	0	345	5	5	5	10	5	5	5
PHF	`.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	. 89
Grade		0			0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	418 850 850 0.99	348 923 923 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	420 1081 1081 1.00 1700 1700	350 1168 1168 0.99 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	772 429 0.99 425 0.98	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	778 375	775 377
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.98 0.98	0.98 0.98
due to Impeding Movements Movement Capacity: (pcph)	0.97 363	0.97 367

		Microcomputers		ortation
HCS:	Unsignalized Inter	section Releas	se 2.1	Page 3
***	******	****	*****	*****

Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	cal	LOS	Delay By App
EB EB EB	L T R	7 7 12	367 425 923	> >	536	> >	7.1	> > B	7.1
WB WB WB	L T R	7 7 7	363 425 850	> > >	477	> > >	7.9	> B >	7.9
NB	L	7	1168			3.1		A	0.0

Intersection Delay = 0.3

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... EL51 00P.HC0

Streets: (N-S) 51st Avenue

(E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2000 Pk Season-(4-6:00 PM) w/Casino Exst Geometr

## Two-way Stop-controlled Intersection

	Northbound		Southbound			Ea	stbou	nd	Westbound			
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	. 0	0>	1<	0
Stop/Yield			N	_		N						
Volumes	10	445	0	5	525	5	0	5	15	0	0	5
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

#### WorkSheet for TWSC Intersection \_\_\_\_\_ Step 1: RT from Minor Street WB EB Conflicting Flows: (vph) 445 528 Potential Capacity: (pcph) 824 748 Movement Capacity: (pcph) 824 748 Prob. of Queue-free State: 0.99 0.97 Step 2: LT from Major Street SB 445 530 Conflicting Flows: (vph) Potential Capacity: (pcph) 1052 Movement Capacity: (pcph) 1052 Prob. of Queue-free State: 0.99 TH Saturation Flow Rate: (pcphpl) 1700 RT Saturation Flow Rate: (pcphpl) 1700 Major LT Shared Lang Prob 958 958 0.99 1700 1700 Major LT Shared Lane Prob. of Queue-free State: 0.99 0.98 0.99 0.98 Step 3: TH from Minor Street \_\_\_\_\_ Conflicting Flows: (vph) 990 330 Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State: 0.97 0.97 0.97 0.97 0.98 \_\_\_\_\_\_ Step 4: LT from Minor Street WB \_\_\_\_\_ 998 990 Conflicting Flows: (vph) Potential Capacity: (pcph) 280 283 Major LT, Minor TH 0.95 0.97 Impedance Factor: Adjusted Impedance Factor: 0.96 0.98 Capacity Adjustment Factor due to Impeding Movements 0.94 0.97 Movement Capacity: (pcph) 262 27

	Center For	Microcomputers	In Transpo	rtation
HCS:	Unsignalized Inters	section Releas	se 2.1	Page 3
***	*****	*****	*****	*****

Mov	ement				SharedCap Csh(pcph)		tal	LOS	Delay By App
EB EB	T R	7 19	321 748		551	> >	6.9	> > B	6.9
WB	R	7	824	>	824	>	4.4	> A	
NB SB	L L	12 7	958 1052			3.8 3.4		A A	0.1

Intersection Delay = 0.2

File Name ..... DO51\_00A.HC0

Streets: (N-S) 51st Avenue

ry

(E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2000 Pk Season-(7-9:00 AM) w/ Casino Exst Geomet

## All-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	Т	R
No. Lanes	1	1<	0	1	1<	0	0>	1<	0	0>	1<	0
Volumes	15	345	60	40	305	10	15	55	20	60	40	60
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0	}		0	l		0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

				. <del></del>
Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate Proportion LT Proportion RT Opposing Approach Flow Rate Conflicting Approaches Flow Rate Proportion, Subject Approach Flow Rate Proportion, Opposing Approach Flow Rate Lanes on Subject Approach Lanes on Opposing Approach LT, Opposing Approach RT, Opposing Approach LT, Conflicting Approaches RT, Conflicting Approaches	17 67 472 0.04 0.14 399 280 0.41 0.35 2 45 11 84 89	45 11 399 0.11 0.03 472 280 0.35 0.41 2 2 17 67 84 89	17 22 101 0.17 0.22 179 871	67 67 179 0.37 0.37 101 871 0.16 0.09 1 17 22 62
Proportion LT, Opposing Approach Proportion RT, Opposing Approach Proportion LT, Conflicting Approaches Proportion RT, Conflicting Approaches Approach Capacity	0.11 0.03 0.30 0.32 830	0.04 0.14 0.30 0.32 857	0.37 0.37 0.07	0.17 0.22 0.07 0.09 316

## Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	472	830	0.57	8.7	В
SB	399	857	0.47	5.9	В
EB	101	265	0.38	4.3	Α
WB	179	316	0.57	8.6	В

Intersection Delay = 7.31
Level of Service (Intersection) = B

All-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	${f T}$	R	L	$\mathbf{T}_{_{_{1}}}$	R	L	T	R	L	T	R
No. Lanes	1	1<	0	1	1<	0	0>	1<	0	0>		~
	~ ~		•	~ <del>_</del> _		- 1	-		- 1		1<	0
Volumes	20	400	30	35	455	15	10	35	20	45	40	35
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0	1		0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

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Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate	22 34 505	39 17 567	11 22 72	51 39
Proportion LT Proportion RT	0.04 0.07	0.07		135 0.38 0.29
Opposing Approach Flow Rate Conflicting Approaches Flow Rate	567 207	505 207	1072	72 1072
Proportion, Subject Approach Flow Rate Proportion, Opposing Approach Flow Rate Lanes on Subject Approach	0.39 0.44 2	0.44 0.39 2	0.06 0.11 1	0.11 0.06
Lanes on Opposing Approach LT, Opposing Approach	2 39	2 22	1 51	1 11
RT, Opposing Approach LT, Conflicting Approaches RT, Conflicting Approaches	17 62 61	34 62 61	39 61 51	22 61 51
Proportion LT, Opposing Approach Proportion RT, Opposing Approach	0.07 0.03	0.04 0.07	0.38	0.15 0.31
Proportion LT, Conflicting Approaches Proportion RT, Conflicting Approaches Approach Capacity	0.30 0.29 889	0.30 0.29 919	0.06 0.05 172	0.06 0.05 257

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	505°	889	0.57	8.7	
SB	567	919	0.62	10.4	В
EB	72	172	0.42	4.9	C A
WB	135	257	0.52	7.3	B

Intersection Delay = 9.10
Level of Service (Intersection) = B

Streets: (N-S) 51st Avenue (E-W) Baseline Road Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2000 Pk Season-(7-9:00 AM) w/Casino Exst Geometr

# All-way Stop-controlled Intersection

					====	====	=====	=====	=====	=====	=====	=====	
	Nor	thbou	nd	Sou	Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R	
No. Lanes	1	1<	0	1	1<	0	1	1<	0	1	1<	0	
Volumes	35	390	65	85	300	35	40	145	45	40	80	60	
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	
Grade		0			0			0			0		
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0	
CV's (%)	0	0	0	0	0	0 (	0	0	0	0	0	Ō	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate Proportion LT Proportion RT Opposing Approach Flow Rate Conflicting Approaches Flow Rate Proportion, Subject Approach Flow Rate Proportion, Opposing Approach Flow Rate Lanes on Subject Approach Lanes on Opposing Approach LT, Opposing Approach LT, Opposing Approach RT, Opposing Approach LT, Conflicting Approaches RT, Conflicting Approaches Proportion LT, Opposing Approach Proportion RT, Opposing Approaches Proportion RT, Conflicting Approaches Proportion RT, Conflicting Approaches	39 73 550 0.07 0.13 472 461 0.37 0.32 2 96 39 90 118 0.20 0.08 0.20 0.26		0.17 0.14 2 2 45 67 135 112 0.22	
Approach Capacity	767	801	463	439

## Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	550	767	0.72	15.2	 C
SB	472	801	0.59	9.4	В
EB	*	*	*	. *	*
WB	*	*	*	* ·	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

## All-way Stop-controlled Intersection

					=====	=====	=====	=====	=====	=====	=====	====
	Nor	thbou	nd	Sou	Southbound			stbou	nd	Westbound		
	L	${f T}$	R	L	${f T}$	R	L	T	R	L	$\mathbf{T}$	R
No. Lanes	1	1<	0	1	1<	0	1	1<	0	1	1<	.0
Volumes	35	400	50	85	450	70	40	95	55	60	135	70
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0	- 1		0	İ		0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	Ō	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Analy	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate Proportion LT Proportion RT Opposing Approach Flow Rate Conflicting Approaches Flow Rate	39 56 544 0.07 0.10 681 512	544 512		67 79 298 0.22 0.27 214 1225
Proportion, Subject Approach Flow Rate	0.31	0.39	0.12	0.17
Proportion, Opposing Approach Flow Rate	0.39	0.31	0.17	0.12
Lanes on Subject Approach	2	2	2	2
Lanes on Opposing Approach	2	2	2	2
LT, Opposing Approach RT, Opposing Approach LT, Conflicting Approaches RT, Conflicting Approaches	96	39	67	45
	79	56	79	62
	112	112	135	135
	141	141	135	135
Proportion LT, Opposing Approach Proportion RT, Opposing Approach Proportion LT, Conflicting Approaches Proportion RT, Conflicting Approaches Approach Capacity	0.14	0.07	0.22	0.21
	0.12	0.10	0.27	0.29
	0.22	0.22	0.11	0.11
	0.28	0.28	0.11	0.11
	786	827	429	453

	Center	For	Microcom	puters	In	Transportation	
HCS:	Unsignalized I	nters	section	Releas	se 2	2.1	Page 3
						· * * * * * * * * * * * * * * * * * * *	

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	Los
NB SB	544 681	786 827	0.69	13.9	C
EB	*	*	*	*	· *
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue (N-S) 51st Avenue
Analyst: Kirkham Michael File Name: SO51\_00A.HC9
Area Type: Other 6-23-97 AM Peak

Comment: 2000 Pk Season with Casino, Exst Geometry

	Eastbound			Westbound			Northbound			Southbound		
	L	${f T}$	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1 .	<	1	1 .	<	1	1	<	1	1	1
Volumes	25	85	10	25	40	75	10	405	25	130	365	15
Lane Width	12.0	12.0	_	12.0	12.0	_	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0	ļ		0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
				Signa	at Obe	eratio	ons					
Phase Combin	nation	n 1	2	3	4	1			5	6	7	8
EB Left		*				NB	Left	: ;	*			
Thru		*					Thru	1 7	*			
Right		*					Rial	nt :	*			

Right Peds \*
SB Left \*
Thru \* Right Peds WB Left Thru Right Right \* Peds Peds NB Right EB Right SB Right WB Right 30.0A Green Green 52.0A Yellow/AR 4.0 Yellow/AR 4.0

Cycle Length: 90 secs Phase combination order: #1 #5

	Lane Mvmts							Approach: Delay LO		
	MVIIICS	cap	FIOW	Racio	Ratio	ретау	LOS	ретау	LOS	
EB	${f L}$	374	1087	0.075	0.344	12.8	В	13.3	В	
	$\mathtt{TR}$	570	1656	0.188	0.344	13.4	В			
WB	L	405	1175	0.069	0.344	12.8	В	13.5	В	
	TR	523	1517	0.247	0.344	13.7	B			
NB	L	312	529	0.035	0.589	5.0	A	7.2	В	
	TR	981	1666	0.492	0.589	7.2	В			
SB	L	228	388	0.639	0.589	11.9	В	8.0	В	
	${f T}$	990	1681	0.414	0.589	6.7	В			
	R	842	1429	0.020	0.589	5.0	Α			
		Int	ersection	Delay =	8.9 se	c/veh Int	ersect	tion LOS	= B	
				<del>-</del> .		_				

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.494

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue
Analyst: Kirkham Michael
File Name: SO51\_00P.HC9
6-23-97 PM Peak

Comment: 2000 Pk Season with Casino, Exst Geometry

	=====	====	=====	=====	====	====:	=====	====	=====	=====	====:	=====
		lastbo	und	We	stbou:	nd	No:	rthbo	und	So	uthboi	und
	L	${f T}$	R	L	$\mathbf{T}$	R	L	${f T}$	R	L	${f T}$	R
				]								
No. Lanes	1	1	<	1	1	<	1	1	<	1	1	1
Volumes	25	50	15	40	140	105	20	430	25	100	530	25
Lane Widtl	1   12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
										- 		
				Signa	al Ope	eratio	ons					
Phase Comb	oinatio	n 1	2	3		4			5	6	7	8
EB Left		*				NB	Left	Ξ .	*			
Thru		*					Thru	<b>1</b>	*			
Right		*					Rigl	nt '	*			
Peds		*					Peds	3	*			
WB Left		*				SB	Left		*.			
Thru		*					Thru	י ג	*			
Right		*					Rigl	nt '	*			
Peds		*					Peds	3	*			
NB Right						EB	Rigl	nt				
SB Right						WB	Rigl	nt				

Green 52.0A

Green 30.0A Yellow/AR 4.0 Yellow/AR 4.0 Cycle Length: 90 secs Phase combination order: #1 #5

			Intersect						
	T								
	Lane	Group:	Adj Sat	v/c	g/C			Approac	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	224	651	0.125	0.344	13.1	·B	13.1	В
	TR	585	1699	0.125	0.344	13.1	В		
WB	L	471	1367	0.096	0.344	12.9	В	15.2	C
	TR	567	1646	0.485	0.344	15.5	С		
NB	L	158	269	0.139	0.589	5.4	В	7.2	В
	TR	1028	1746	0.497	0.589	7.3	В		
SB	L	214	364	0.522	0.589	8.9	В	8.0	В
	${f T}$	1036	1759	0.575	0.589	8.0	В		
	R	880	1495	0.032	0.589	5.0	Α		
		Int	ersection	Delay =	9.4 sec	c/veh Int	ersect	cion LOS	= B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.542

HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... BR51\_00A.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis...... 6/23/97
Other Information...... 2000 Pk Season-(7-9:00 AM) w/Casino Exst Geometr

#### Two-way Stop-controlled Intersection

			:=====	=====	=====	====	=====	====	=====	======	=====	====
	Nor	thboun	ıa j	Sou	thbour	nd	Eastbound			Westbound		
	L	T	R	${f L}$	${f T}$	R	L	${f T}$	R	L	T	R
	~		~									
No. Lanes	1	1	0	0	1<	. 0	1	0	1	0	0	0
Stop/Yield			N			И			- [		_	•
Volumes	30	485	j		430	25	55		85			
PHF	.89	.89			.89	.89	.89		.89		-	
Grade		0			0			0			0	
MC's (%)	0	0	l		0	0	0		0			
SU/RV's (%)	0	0	-		0	0	0		0			
CV's (%)	13	13	Ì		13	13	13		13			
PCE's	1.1	1.1			1.1	1.1	1.1		1.1			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		442 827 827 0.87
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		455 1041 1041 0.96
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		958 295
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.96 0.96
due to Impeding Movements Movement Capacity: (pcph)		0.96 285

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	68	285		16.6	C	
EB	R	106	827		5.0	A	10.2
NB	L	37	1041		3.6	A	0.2
		Int	tersection	n Delay =	1.4		

File Name ..... BR51\_00P.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2000 Pk Season-(4-6:00 PM) w/Casino Exst Geometr

### Two-way Stop-controlled Intersection

	Nor	Northbound   South			==== thbou	======================================				Westbound		
	L	. T	R	L	T	R	L	T	R	L	Т	R
No. Lanes Stop/Yield	1	1	0 N	0	1<	0 N	1	0	1	0	0	0
Volumes PHF	45 .89	540 .89			650 .89	. 45	20 .89		40			
Grade		0			0	.09	.03	0	.09		0	•
MC's (%) SU/RV's (%)	0	0 0			0 0	0	0 · 0		0			
CV's (%) PCE's	8 1.1	8 1.1			8 1.1	8	8 1.1		8			
							T • T		1.1			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

		. <b></b>
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		672 632 632 0.92
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	·	695 800 800 0.93
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		1258 198
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.93 0.93
due to Impeding Movements Movement Capacity: (pcph)		0.93 184

•	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	24	184		22.5	D	
EB	R	50	632		6.2	В	10.2
NB	L	56	800		4.8	A	0.3
		Int	tersection	n Delav =	n` s		

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... PE51\_05A.HC0

Streets: (N-S) 51st Avenue (E-W) Pecos Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael Date of Analysis..... 7/16/97

Other Information...... 2005 AM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

=======:	=====	=====	=====	=====	=====	====									
	Nor	thbou:	nd	Southbound			Ea	stbou	nd	Westbound					
	L	T	R	L	T	R	L	T	R	L	T	R			
No. Lanes Stop/Yield	0>	1<	0 N	0>	1<	0	0>	1<	0	0>	1<	0			
Volumes	10	300	15	15	355	N 5	15	0	0	10	0	30			
PHF Grade	.95	.95 0	.95	.95	. 95 0	.95	.95	.95 0	.95	.95	.95 0	.95			
MC's (%)	0	0	0	0	0	0	0	0	0	0	Ö	0			
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0			
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	0			
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	308	358
Potential Capacity: (pcph)	967	912
Movement Capacity: (pcph)	967	912
Prob. of Queue-free State:	0.96	1.00
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	315	360
Potential Capacity: (pcph)	1213	1155
Movement Capacity: (pcph)	1213	1155
Prob. of Queue-free State:	0.99	0.99
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	1700	1700
of Queue-free State:	0.98	0.99
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph)	692	698
Potential Capacity: (pcph)	473	469
Capacity Adjustment Factor		
due to Impeding Movements	0.97	0.97
Movement Capacity: (pcph)	458	454
Prob. of Queue-free State:	1.00	1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	690	705
Potential Capacity: (pcph)	422	414
Major LT, Minor TH		
Impedance Factor:	0.97	0.97
Adjusted Impedance Factor:	0.98	0.98
Capacity Adjustment Factor	0.00	2 24
due to Impeding Movements	0.98	0.94
Movement Capacity: (pcph)	411	389

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HCS: Unsignalized Intersection Release 2.1	Page 3
*******************	*****

Mov	ement	FlowRate v (pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
EB WB	L L	18 12	389 411	>	389	>	9.7	> B	
WB	R	35	967	>	719	>	5.4	> B	5.4
NB	T.	12	1155	_		3.1		, >	0.1
SB	Ĺ	18	1213			3.0		A	0.1 0.1

Intersection Delay = 0.6

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... PE51\_05P.HC0

Streets: (N-S) 51st Avenue (E-W) Pecos Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 2005 PM Peak Hour-Pk Season-Existing Geometry

### Two-way Stop-controlled Intersection

									====	=====	====:	=====	
	Nor	thbou	nd	Sou	Southbound			Eastbound			Westbound		
	L	T	R	L	Т	R	L	T	R	L	T	R	
No. Lanes Stop/Yield	0>	1<	0 N	0>	1<	0 N	0>	1<	0	0>	1<	0	
Volumes PHF Grade MC's (%) SU/RV's (%) CV's (%)	10 .95	360 .95 0 0	15 .95 0	20 .95 0	415 .95 0 0	5 .95	20 .95 0	10 .95 0 0	10 .95	25 .95 0	10 .95 0 0	50 .95 0	
PCE's	0 1.1	0 1.1	0	0 1.1	0	1.1	0 1.1	0 1.1	0	0 1.1	0 1.1	0 1.1	

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	, WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	368 901 901 0.94	418 850 850 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	375 1136 1136 0.98 1700 1700	420 1081 1081 0.99 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	818 406 0.96 389 0.97	822 404 0.96 387 0.97
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	825 352	845 343
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.93 0.94	0.93 0.94
due to Impeding Movements Movement Capacity: (pcph)	0.93 328	0.88

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HCS:	Unsignalized Intersec	tion Release	2.1 Page	3
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Mov	ement	FlowRate v(pcph)	MoveCa Cm(pcp		SharedCap Csh(pcph)	Avg.To Delay	otal	LOS	Delay By App
EB EB EB	L T R	23 12 12	303 387 850	> >	388	> >	10.6	> C >	10.6
WB WB WB	L T R	29 12 58	328 389 901	> >	539	> > >	8.2	> > B >	8.2
NB SB	L L	12 23	1081 1136			3.4		A A	0.1

Intersection Delay = 1.3

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... SJ51\_05A.HC0

Streets: (N-S) 51st Avenue

(E-W) St. Johns Road

Major Street Direction.... NS

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Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael Date of Analysis..... 7/16/97

Other Information...... 2005 AM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

Nor	thbou	nd	Sou	thbou	nd	Eas	tboun	id	West	bound	 1
L	Т	R	L	${f T}$	R	${f L}$	T	R	L	T	R
0>	1	0	0	1<		1>	0<	0	0	0	0
		N			N						
15	345			365	30	55		25			
.95	.95			. 95	.95	.95		.95			
	0			0			0			0	
0	0			0	0	0		0			
0	0			0	0	0		0			
0	0			0	0	0		0			
1.1	1.1			1.1	1.1	1.1		1.1			
	L 0> 15 95	L T	0> 1 0 N 15 345 .95 .95 0 0 0 0 0 0	L T R L	L T R L T  0> 1 0 0 1<  N  15 345 .95 .95 0 0 0 0 0 0 0 0 0 0 0 0	L T R L T R	L T R L T R L  O> 1 0 0 1< 0 1>  N  15 345 .95 .95 0 0 0 0 0 0  0 0 0 0 0 0  0 0 0 0 0  0 0 0 0	L T R L T R L T	L T R L T R L T R	L T R L T R L T R L T R L T R L T R L T R L T R L T R R L T R R L T R R R L T R R R R	L T R L T R L T R L T R L T R

Vehicle	Critical	,	Follow-up
Maneuver	Gap (tg)		Time (tf)
Left Turn Major Road	5.00	٠.	2.10
Right Turn Minor Road	5.50		2.60
Through Traffic Minor	Road 6.00		3.30
Left Turn Minor Road	6.50		3.40

WB	EB
	380 889 889 0.97
SB	NB
	395 1111 1111 0.98 1700
	0.98
WB	EB
	740 395
	0.98 0.98
	0.98
	SB

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HCS:	Unsignalized Intersection Release 2.1	Page 3
****	* * * * * * * * * * * * * * * * * * * *	*****

Movement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
EB L	64	387	>	470	>		>_	
EB R	29	889	>	470	>	9.5	B >	9.5
NB L	18	1111			3.3		A	0.1

Intersection Delay = 1.0

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... SJ51\_05P.HC0

Streets: (N-S) 51st Avenue

(E-W) St. Johns Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael Date of Analysis..... 7/16/97

Other Information...... 2005 PM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

=========	=====	=====	=====	=====	=====	====	======	=====	====	=====	=====	====
	Nor	thbou	nd	Sou	Southbound			tboun	d	Westbound		
	L	Т	R	L	T	R	L	T	R	L	T	R
No. Lanes Stop/Yield	0>	1	0 N	0	1<	0 N	1>	0<	0	0	0	0
Volumes	15	415	-`		435	30	55		25			•
PHF	.95	.95			.95	.95	. 9.5		.95			
Grade		0	Ī		. 0			0			0	
MC's (%)	0	0			0	0	0		0			
SU/RV's (%)	0	0	. ]		0	0	0		0		-	
CV's (%)	0	0			0	0	. 0		0			
PCE's	1.1	1.1			1.1	1.1	1.1		1.1			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Roa	d 6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		450 819 819 0.96
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:		465 1029 1029 0.98 1700
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		880 328
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.98 0.98
due to Impeding Movements Movement Capacity: (pcph)		0.98 320

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HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.To	tal	LOS	Delay By App
EB	L	64	320	>		>		>	
EB	R	29	819	>	395	>	11.9	C >	11.9
NB	L	18	1029			3.6		A	0.1

Intersection Delay = 1.0

File Name ..... CS51\_05A.HC0

Streets: (N-S) 51st Avenue

(E-W) Casino Entrance

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 2005 AM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

	=====   \tau==				.====	=====	=====	=====		======	====	=====
	ł	thbou			Southbound			stbour		Westbound		
	L	T	R	L	T	R [	L	${f T}$	R	L	${f T}$	R
No. Lanes	0	1<	0	1	1	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		370	20	120	275	[			i	20		85
PHF		.95	.95	.95	.95	1				.95		.95
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0		0
SU/RV's (%)	1	0	0	0	0					0		٠٥
CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1	l				1.1		1.1

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	380 889 889 0.89	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	390 1117 1117 0.88	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	775 377	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.88 0.88	
due to Impeding Movements Movement Capacity: (pcph)	0.88 330	

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HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	23	330		11.7	С	
WB	R	98	889		4.6	A	5.3
SB	L	139	1117		3.7	A	1.1

Intersection Delay = 1.3

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HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... CS51\_05P.HC0

Streets: (N-S) 51st Avenue

(E-W) Casino Entrance

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97
Other Information........... 2005 PM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

=========	=====	=====	=====									
	Nor	thbou	nd	Sou	thbou	nd	Eas	stbour	ıd	West	boun	ıd
	L	T	R	L	Т	R	${f L}$	T	R	L	Т	R
No. Lanes Stop/Yield	0	1<	0 N	1	1	0 N	0	0	0	1	0	1
Volumes PHF		375 .95	30 .95	175 .95	370 .95					30 .95		175 .95
Grade MC's (%)		0	0	. 0	0			0		0	0	0
SU/RV's (%)		0	ő	0	0	1				0		0
CV's (%) PCE's		0 1.1	0	0 1.1	0 1.1					$0 \\ 1.1$		0 1.1
	·		, — · — .			 		<u> </u>	I			

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	390 878 878 0.77	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	405 1099 1099 0.82	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	935 304	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.82 0.82	
due to Impeding Movements Movement Capacity: (pcph)	0.82 248	

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HCS:	Unsignalized Intersection Release 2.1	Page 3
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Move	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	35	248		16.9	C	
WB	R	202	878		5.3	В	5.3
SB	L	202	1099		4.0	A	1.2
		Tm		- D-1	a =		

Intersection Delay = 1.5

Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... DU51\_05A.HC0

(E-W) Dusty Lane

Streets: (N-S) 51st Avenue

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97
Other Information............. 2005 AM Peak Hour-Pk Season-Existing Geometry

## Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes Stop/Yield	0	1<	O N	0>	1	0 N	0	0	0	1>	0<	0
Volumes PHF		470 .95	25 .95	30 .95	385 .95					15 .95		25 .95
Grade MC's (%)		0 0	0	0	0 0			0		0	0	0
SU/RV's (%) CV's (%)		0 0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

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HCS: Unsignalized Intersection Release 2.1	Page 2
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Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	482 789 789 0.96	
Step 2: LT from Major Street	SB	NB
Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	495 996 996 0.96 1700	
of Queue-free State:	0.95	_
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	898 320	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.95 0.95	
due to Impeding Movements Movement Capacity: (pcph)	0.95 305	

Center For Microcomputers In Transportation	
HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement				SharedCap Csh(pcph)	Avg.Tot	al	LOS	Delay By App
WB	L	18	305	>		>		>	
WB	R	29	789	>	491	>	8.1	B >	8.1
SB	L	35	996			3.7		A	0.3

Intersection Delay = 0.5

File Name ..... DU51\_05P.HC0

Streets: (N-S) 51st Avenue

(E-W) Dusty Lane

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst...... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information...... 2005 PM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

		====	====	=====	====	=====	=====	=====	====	======	====:	====
	Nor	thbou	nd	Sou	thbou	nd	Eas	stbour	ıd	West]	bound	ì
	L	T	R	L	T	R	L	Т	R	L	T	R
No. Lanes Stop/Yield	0	1<	0 <b>N</b>	0>	1	0 <b>N</b>	0	0	0	1>	0<	0
Volumes PHF		530	25	30	535	14				15		25
Grade		.95	.95		.95 0			0		.95	0	.95
MC's (%) SU/RV's (%)		0 0	0	0	0					0 0		0
CV's (%) PCE's	-	0 1.1	0	0	0 1.1					0		0
	: - <b></b>								/		_	T • T

#### Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

	Center	For Microc	omputers In	Transportation	
HCS:	Unsignalized I	ntersection	Release	2.1	Page 2
***	******	*******	*****	******	*****

# WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	542 736 736 0.96	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	555 932 932 0.96 1700	
of Queue-free State:	0.94	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1108 242	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.94	
due to Impeding Movements Movement Capacity: (pcph)	0.94 228	

	Center For	Microcomputers	In	Transportation	
	Unsignalized Inter	section Relea	se 2	2.1	Page 3
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Movement	FlowRate v(pcph)		SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB L	18	228 >		>	> .	
WB R	29	736 >	397	10.3	C >	10.3
SB L	35	932		4.0	A	0.2

Intersection Delay = 0.5

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... ES51 05A.HC0

Streets: (N-S) 51st Avenue

(E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97 Other Information.......... 2005 AM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

	Nor	thbou	nd	Sou	Southbound Eastbound			nd	Westbound			
	${f L}$	${f T}$	R	L	${f T}$	R	L	T	R	L	T	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N			N						
Volumes	15	460	15	25	395	15	30	0	10	10	0	55
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0	[		0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0.	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

#### WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	468 802 802 0.92	402 866 866 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	475 1018 1018 0.97 1700 1700	410 1093 1093 0.98 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements	918 360 0.94	918 360 0.94
Movement Capacity: (pcph) Prob. of Queue-free State:	337 1.00	337 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	915 313	938
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.94 0.95	0.94
due to Impeding Movements Movement Capacity: (pcph)	0.94 294	0.88

	Cente:	r For M	licrocomput	ers In	Transportation	
HCS:	Unsignalized :	Interse	ction Re	lease 2	2.1	Page 3
****	*****	*****	*****	****	*****	****

Movement		FlowRate v(pcph)	MoveCap Cm(pcph)		SharedCap Csh(pcph)	Avg.Total Delay		LOS	Delay By App
EB	L	35	265	>	222	>	17 1	>	10 4
EB	R	12	866	>	322	>	13.1	) >	13.1
WB	L	12	294	>	630	>	c	> .	<i>c</i>
WB	R	64	802	>	630	>	6.5	B >	6.5
NB SB	L L	18 29	1093 1018			3.3 3.6		A A	0.1

Intersection Delay = 1.1

HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... ES51 05P.HC0

Streets: (N-S) 51st Avenue

(E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis.......... 7/16/97 Other Information......... 2005 PM Peak Hour-Pk Season-Existing Geometry

#### Two-way Stop-controlled Intersection

				=		====	=====	=====	====	=====	====:	=====
	Nor	thbou	nd	Sou	Southbound			stbou	nd	Westbound		
	L	T	R	L	T	R	$\mathbf{L}$	T	R	L	${f T}$	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			И			N			-			_
Volumes	15	535	15	25	570	15	30	0	10	10	0	55
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		. 0			0			0	1		0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	. 0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

#### WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	542 736 736 0.91	578 705 705 0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob.	550 938 938 0.97 1700 1700	585 902 902 0.98 1700 1700
of Queue-free State:	0.95 	0.97
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	1168 266	1168 266
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.92 244 1.00	0.92 244 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1165 224	1188 217
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.92 0.94	0.92 0.94
due to Impeding Movements Movement Capacity: (pcph)	0.92 206	0.86

• .	Center	For Micro	computers ]	In Tra	nsportation
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Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.To	tal	LOS	Delay By App	
EB	L	35	186	>		>	10.0	> ~		
EB.	R	12	705	>	229	>	19.8	>	19.8	
WB	L	12	206	>		>	0 1	> _		
WB	R	64	736	>	523	>	8.1	B >	8.1	
NB SB	L.	18 29	902 938			4.1 4.0		A A	0.1 0.2	

Intersection Delay = 1.2

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... EL51 05A.HC0

Streets: (N-S) 51st Avenue (E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(7-9:00AM) w/Casino-Exst Geometry

#### Two-way Stop-controlled Intersection

	Nor	Northbound			Southbound			stbou	nd	Westbound			
	L	T	R	L	T	R	L	T	R	. L	T	R	
No. Lanes Stop/Yield	0>	1<	0 N	0>	1<	0 N	0>	1<	0	0>	1<	0	
Volumes	10	485	5	0	395	5	5	5	15	5	10	5	
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	
Grade		0			0			0	ļ		0		
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	

#### Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street WB E3  Conflicting Flows: (vph) 488 398  Potential Capacity: (pcph) 784 876  Movement Capacity: (pcph) 784 876  Prob. of Queue-free State: 0.99 0.98  Step 2: LT from Major Street SB NI  Conflicting Flows: (vph) 490 406  Potential Capacity: (pcph) 1001 1108  Movement Capacity: (pcph) 1001 1108  Prob. of Queue-free State: 1.00 0.99
Potential Capacity: (pcph) 784 876 Movement Capacity: (pcph) 784 876 Prob. of Queue-free State: 0.99 0.98 Step 2: LT from Major Street SB NI Conflicting Flows: (vph) 490 406 Potential Capacity: (pcph) 1001 1108 Movement Capacity: (pcph) 1001 1108
Conflicting Flows: (vph) 490 400 Potential Capacity: (pcph) 1001 1109 Movement Capacity: (pcph) 1001 1109
Potential Capacity: (pcph) 1001 1109 Movement Capacity: (pcph) 1001 1109
TH Saturation Flow Rate: (pcphpl) 1700 1700 RT Saturation Flow Rate: (pcphpl) 1700 1700 Major LT Shared Lane Prob. of Queue-free State: 1.00 0.98
Step 3: TH from Minor Street WB EN
Conflicting Flows: (vph) 898 898 Potential Capacity: (pcph) 369 369 Capacity Adjustment Factor due to Impeding Movements 0.98 0.98 Movement Capacity: (pcph) 363 363 Prob. of Queue-free State: 0.97 0.98
Prob. of Queue-free State: 0.97 0.98  Step 4: LT from Minor Street WB EF
Conflicting Flows: (vph) 905 902 Potential Capacity: (pcph) 317 318 Major LT, Minor TH Impedance Factor: 0.96 0.95 Adjusted Impedance Factor: 0.97 0.96 Capacity Adjustment Factor due to Impeding Movements 0.95 0.95
Movement Capacity: (pcph) 302 303

	Cente	r For	Microco	mputers	In	Transp	portation		
HCS:	Unsignalized	Inters	section	Releas	se 2	2.1		Page	3
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Movement		FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	tal	LOS	Delay By App
EB EB EB	L T R	7 7 19	303 363 870	> >	514	, > , >	7.5	> > B >	7.5
WB WB	L T R	7 12 7	302	> > >	399	> > >	9.7	> > B >	9.7
NB	L	12	1105			3.3		A	0.1

Intersection Delay = 0.4

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... EL51 05P.HC0

Streets: (N-S) 51st Avenue

(E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis...... 6/23/97
Other Information...... 2005 Pk Season-(4-6:00PM)w/Casino-Exst Geometry

#### Two-way Stop-controlled Intersection

A=====================================												
	Nor	Northbound			Southbound			stbou	nd	Westbound		
	L	T	R	L	Т	R	L	T	R	L	Т	R
No. Lanes	0>	1<	0	0>	1<	0	0>	1<	0	0>	1<	0
Stop/Yield Volumes	10	510	N	5	605	N	0	5	1 -	•	0	_
			- 1	_	605	10	•	_	15	0	U	- 5
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0	- 1		0	,		. 0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	510 764 764 0.99	610 680 680 0.97
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State: TH Saturation Flow Rate: (pcphpl) RT Saturation Flow Rate: (pcphpl) Major LT Shared Lane Prob. of Queue-free State:	510 980 980 0.99 1700 1700	615 873 873 0.99 1700 1700
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	1140 275 0.97 266 1.00	1135 277 0.97 267 0.97
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1145 230	1138 232
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.94 0.95	0.97 0.97
due to Impeding Movements Movement Capacity: (pcph)	0.93 213	0.96 224

#### Intersection Performance Summary

Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	al	LOS	Delay By App
EB EB	T R	7 19	267 680	>	480	>	7.9	> > B	7.9
WB	R	7	764	>	764	>	4.8	> A	
NB SB	L L	12 7	873 980			4.2 3.7		A A	0.1

Intersection Delay = 0.2

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... DO51 05A.HC0

Streets: (N-S) 51st Avenue (E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(7-9:00AM) w/Casino-Exst Geometry

#### All-way Stop-controlled Intersection

i							=					
	Nor	thbou	nd	Southbound		Eastbound			Westbound			
	L	T	R	L	${f T}$	R	L	Т	R	L	${f T}$	R
No Tomor												
No. Lanes	1	1<	0	1	1<	0	0 >	1<	0	0 >	1<	0
Volumes	20	405	75	50	345	10	20	70	20	75	50	75
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate	22	56	22	84
RT Flow Rate	84	11	22	84
Approach Flow Rate	561	455	123	224
Proportion LT	0.04	0.12	0.18	0.38
Proportion RT	0.15	0.02	0.18	0.38
Opposing Approach Flow Rate	455	561	224	123
Conflicting Approaches Flow Rate	347	347	1016	1016
Proportion, Subject Approach Flow Rate	0.41	0.33	0.09	0.16
Proportion, Opposing Approach Flow Rate	0.33	0.41	0.16	0.09
Lanes on Subject Approach	2	2	1	1
Lanes on Opposing Approach	2	2	1	1
LT, Opposing Approach	56	22	84	22
RT, Opposing Approach	11	84	84	22
LT, Conflicting Approaches	106	106	78	78
RT, Conflicting Approaches	106	106	95	95
Proportion LT, Opposing Approach	0.12	0.04	0.38	0.18
Proportion RT, Opposing Approach	0.02	0.15	0.38	0.18
Proportion LT, Conflicting Approaches	0.31	0.31	0.08	0.08
Proportion RT, Conflicting Approaches	0.31	0.31	0.09	0.09
Approach Capacity	813	840	273	315

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HCS: Unsignalized Intersection Release 2.1	Page 3
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Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NTT)	FC3				
NB	561	813	0.69	13.8	С
SB	455	840	0.54	7.8	В
EB	123	273	0.45	5.5	В
WB	224	315	0.71	15.0	Ċ

Intersection Delay = 11.24
Level of Service (Intersection) = C

# Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1 Page

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... DO51\_05P.HC0

Streets: (N-S) 51st Avenue (E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(4-6:00PM)w/Casino-Exst Geometry

#### All-way Stop-controlled Intersection

=======================================	=====	=====	====	=====	=====	=====							
	Northbound			Sou	Southbound			Eastbound			Westbound		
	L	T	R	L	${f T}$	R	L	T	R	L	${f T}$	R	
No. Lanes	1	1<	0	1	1<	0	0>	1<	0	0>	1<	0	
Volumes	20	455	35	45	520	15	15	45	25	50	50	40	
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	
Grade		0	ľ		0	1		0	-		0		
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0	
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate	22	51	17	56
RT Flow Rate	39	17	28	45
Approach Flow Rate	572	652	96	157
Proportion LT	0.04	0.08	0.18	0.36
Proportion RT	0.07	0.03	0.29	0.29
Opposing Approach Flow Rate	652	572	157	96
Conflicting Approaches Flow Rate	253	253	1224	1224
Proportion, Subject Approach Flow Rate	0.39	0.44	0.06	0.11
Proportion, Opposing Approach Flow Rate	0.44	0.39	0.11	0.06
Lanes on Subject Approach	2	2	1	.1
Lanes on Opposing Approach	2	2	1	1
LT, Opposing Approach	51	22	56	17
RT, Opposing Approach	17	39	45	28
LT, Conflicting Approaches	73	73	73	73
RT, Conflicting Approaches	73	73	56	56
Proportion LT, Opposing Approach	0.08	0.04	0.36	0.18
Proportion RT, Opposing Approach	0.03	0.07	0.29	0.29
Proportion LT, Conflicting Approaches	0.29	0.29	0.06	0.06
Proportion RT, Conflicting Approaches	0.29	0.29	0.05	0.05
Approach Capacity	878	915	186	253

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
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Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	*	*	*	*	*
SB	*	*	*	*	*
EB	*	*	*	*	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

File Name ..... BA51\_05A.HC0

Streets: (N-S) 51st Avenue (E-W) Baseline Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(7-9:00AM)w/Casino-Exst Geometry

#### All-way Stop-controlled Intersection

	Northbound   Southbound			Eastbound			Westbound					
	L	T	R	L	T	R	L	${f T}$	R	L	T	R
No. Lanes	1	1<	0	1	1<	0	1	1<	0	1	1<	.0
Volumes	45	460	80	105	345	45	50	180	55	45	100	75
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0	l		0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	Q	0	0
CV's (%)	. 0	0	0	0	0	0	0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Anal	ysis Work	Sheet		. = =
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate Proportion LT Proportion RT Opposing Approach Flow Rate Conflicting Approaches Flow Rate Proportion, Subject Approach Flow Rate Proportion, Opposing Approach Flow Rate Lanes on Subject Approach Lanes on Opposing Approach LT, Opposing Approach RT, Opposing Approach LT, Conflicting Approaches	51 90 658 0.08 0.14 557 567 0.37 0.31 2 2 118 51	118 51 557 0.21 0.09 658 567 0.31 0.37 2 2 51 90	56 62 320 0.17 0.19 247	51 84 247 0.21 0.34 320 1215 0.14 0.18 2 2 56 62 169
RT, Conflicting Approaches Proportion LT, Opposing Approach	146 0.21	146 0.08	141 0.21	141
Proportion RT, Opposing Approach Proportion LT, Conflicting Approaches Proportion RT, Conflicting Approaches Approach Capacity	0.09 0.19 0.26	0.14 0.19 0.26	0.34 0.14 0.12	0.19 0.14 0.12
TAPATORCII Capacity	763	796	476	444

## Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	Los
NB	658	763	0.86	26.4	D
SB	557	796	0.70	14.3	Č
EB	*	*	*	*	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

File Name ..... BA51\_05P.HC0

Streets: (N-S) 51st Avenue (E-W) Baseline Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(4-6:00PM)w/Casino-Exst Geometry

### All-way Stop-controlled Intersection

										=====	=====	
	Northbound		nd	Sou	Southbound			stbou:	nd	Westbound		
	L	T	R	L	${f T}$	R	L	T	R	L	T	R
No. Lanes	1	1<	0	7	1<	0	1	1<		1	1<	
Volumes	40	455	55	100	520	85	50	120	65	70	165	85
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade	}	0			0	ľ		0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0
CV's (%)	0	0	0	0	0	0	.0	0	0	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Anal	ysis Work	Sheet	,	
	NB	SB	EB	WB
LT Flow Rate	45	112	56	79
RT Flow Rate	62	96	73	96
Approach Flow Rate	618	792	264	360
Proportion LT	0.07	0.14	0.21	0.22
Proportion RT	0.10	0.12	0.28	0.27
Opposing Approach Flow Rate	792	618	360	264
Conflicting Approaches Flow Rate	624	624	1410	1410
Proportion, Subject Approach Flow Rate	0.30	0.39	0.13	0.18
Proportion, Opposing Approach Flow Rate	0.39	0.30	0.18	0.13
Lanes on Subject Approach	2	2	2	2
Lanes on Opposing Approach	2	2	2	2
LT, Opposing Approach	112	45	79	56
RT, Opposing Approach	96	62	96	73
LT, Conflicting Approaches	135	135	157	157
RT, Conflicting Approaches	169	169	158	158
Proportion LT, Opposing Approach	0.14	0.07	0.22	0.21
Proportion RT, Opposing Approach	0.12	0.10	0.27	0.28
Proportion LT, Conflicting Approaches	0.22	0.22	0.11	0.11
Proportion RT, Conflicting Approaches	0.27	0.27	0.11	0.11
Approach Capacity	775	817	441	460

## Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	618	775	0.80	20.7	D
SB	792	817	0.97	39.9	Ē
EB	*	*	*	*	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997 Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue (N-S) 51st Avenue
Analyst: Kirkham Michael File Name: SO51\_05A.HC9
Area Type: Other 6-23-97 AM Peak
Comment: 2005 Pk Season with Casino, Exst Geometry

Comment: 20	05 PK Season	with Ca	asino, E	xst	Geome	etry				
	Eastbound	====== W   E	stbound	===:	Nor	rthbou	ind	So	===== uthbov	==== und
	L T 1	R L	T 	R 	L	T	R 	L	T	R
No. Lanes	1 1 <	1 1	1 <		1	1 <		1	1	1
Volumes Lane Width	30 110	15 25	5 50 ) 12.0	95	15 12.0	480 12.0	30	2	425 12.0	15 12 0
RTOR Vols		0		0	Ī		0			0
Lost Time	3.00 3.00 3	.00 3.00	3.00 3	.00	3.00	3.00	3.00	3.00	3.00	3.00
		Sign	nal Oper	atio	ons					
Phase Combin	nation 1	2 3	3 4	NB	Left	. 5	5	6 *	7	8
Thru	*			INB	Thru			*		
Right	* *			1	Righ			*		
Peds WB Left	*			SB	Peds Left		;	*		•
Thru	*				Thru	լ *		*		
Right Peds	*				Righ Peds		•	*		
NB Right				EB	Righ	ıt				
SB Right Green	30.0A			WB	Righ een		A 40.	0.70		
Yellow/AR	4.0			Ye.	Llow/A	R 4.0	4.	. 0		
Cycle Lengtl	n: 90 secs	Phase o	ombinat	ion	order	: #1	#5 #6	5 		

			Intersect	ion Perf	ormance	simmary Simmary			
	Lane	Group:	Adj Sat	v/c	g/C	_		Approac	
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	316	918	0.108	0.344	13.0	В	13.6	В
	TR	569	1651	0.248	0.344	13.7	В		
WB	L	343	996	0.082	0.344	12.9	В	13.9	В
	TR	522	1515	0.312	0.344	14.1	В		
NB	L	147	323	0.116	0.456	9.1	В	15.9	С
	TR	759	1666	0.755	0.456	16.1	C		
SB	L	240	1597	0.750	0.233	20.0	C	10.5	В
	T	990	1681	0.483	0.589	7.2	В		
	R	842	1429	0.020	0.589	5.0	Α		
		Int	ersection 1	Delay =	13.2 sed	c/veh Int	ersect	cion LOS	= B
T	//	~		~ '	/	/ \			

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.613

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997 Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue (N-S) 51st Avenue

Streets: (E-W) Southern Avenue
Analyst: Kirkham Michael
File Name: SO51\_05P.HC9
Area Type: Other
6-23-97 PM Peak

Comment: 2005 Pk Season with Casino, Exst Geometry 

	Eas	stbou	ınd	Wes	stbour	nd	No	thbou	ınd	Sou	ıthboı	und
	L	T	R	r _	T	R	L	${f T}$	R	L	T	R
No. Lanes Volumes Lane Width RTOR Vols Lost Time	1 30 12.0 1 3.00 3		20		1 4 175 12.0	130	1 20 12.0		30		1 615 12.0	0
				Signa	al Ope	eratio	ons					
Phase Combi	nation	1	2	3	4	ł		Ē	5	6	7	8
EB Left		*				NB	Left	, ,	ŧ			
Thru		*					Thru	1 *	r			
Right		*				1	Righ	ıt *	t			
Peds		*					Peds	; ;	t .			
WB Left	-	*				SB	Left	- 1	t			
Thru		*					Thru		t i			
Right		*				1	Righ		t			
Peds		*				İ	Peds		t			
NB Right						EB	Righ					
SB Right						WB	Righ					

Yellow/AR Yellow/AR 4.0 Cycle Length: 90 secs Phase combination order: #1 #5

30.0A

4.0

Green

			Intersect	tion Perf	ormance	Summary			
	Lane	Group:	Adj Sat	v/c	g/C	_		Approad	ch:
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	Ŀ	168	487	0.203	0.344	13.5	В	13.3	В
	TR	583	1693	0.153	0.344	13.2	В		
WB	L	452	1311	0.124	0.344	13.1	В	16.5	C
	TR	567	1646	0.605	0.344	17.1	C		
NB	L	88	150	0.249	0.589	6.1	В	7.9	В
	TR	1026	1743	0.570	0.589	8.0	В		
SB	L	164	279	0.852	0.589	32.0	D	12.8	В
	${f T}$	1036	1759	0.667	0.589	9.3	В		
	R	880	1495	0.039	0.589	5.0	A		
		Int	ercection	Dolar -	12 1 00	ad troh In	targagi	tion The	_ D

Green 52.0A

Intersection Delay = 12.1 sec/veh Intersection LOS = B Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.761

File Name ..... BR51\_05A.HC0

Streets: (N-S) 51st Avenue (E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(7-9:00AM)w/Casino-Exst Geometry

#### Two-way Stop-controlled Intersection

											=====	====
	Nor	thbour	ıd	Sou	thbour	nd	Eas	tbou	nd	West	bound	l
	L	T	R	L	${f T}$	R	L	T	R	L	T	R
37 - T												
No. Lanes	Τ .	1	0	0	1<	0	1	0	11	0	0	0
Stop/Yield			N			N			. [			
Volumes	40	575	]		510	30	70		105			
PHF	.89	.89			.89	.89	.89		.89			
Grade		0			0	1		0			0	
MC's (%)	0	0			0	0	0		0			
SU/RV's (%)	0	0	1		0	0	0		0			
CV's (%)	13	13			13	13	13		13			
PCE's	1.1	1.1			1.1	1.1	1.1		1.1			

#### Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

### WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		525 750 750 0.83
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		540 948 948 0.95
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		1140 232
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.95 0.95
due to Impeding Movements Movement Capacity: (pcph)		0.95 220

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
****	*********	

Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	87	220		27.0	D	100
EB	R	130	750		5.8	В	10.2
NB	L	50	948		4.0	A	0.2

Intersection Delay = 1.5

File Name ..... BR51\_05P.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 Pk Season-(4-6:00PM)w/Casino-Exst Geometry

#### Two-way Stop-controlled Intersection

	Northbound		Southbound		Eastbound		nd	Westbound				
	L	T	R	L	T	R	L	T	R	L	T	·R
No. Lanes	1	1	0	0	1<	0	1	0	1	0	0	0
Stop/Yield			N			N			Ì			
Volumes	55	625	1		760	50	25		50			
PHF	.89	.89			.89	.89	.89		.89			
Grade		0	į		0			0	ļ		0	
MC's (%)	0	0			0	0	0		0		_	
SU/RV's (%)	0	0			0	0	0		ol			
CV's (%)	8	8			8	8	8		8			
PCE's	1.1	1.1	[		1.1	1.1	1.1		1.1			

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

	Center	For Micro	computers In	Transportation	
HCS:	Unsignalized I:	ntersection	Release	2.1	Page 2
***	******	*****	*****	******	*****

## WorkSheet for TWSC Intersection

		. <b></b>
Step 1: RT from Minor Street	·- WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		785 554 554 0.89
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		810 705 705 0.90
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		1465 150
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.90 0.90
due to Impeding Movements Movement Capacity: (pcph)		0.90 136

	Center For Microcomputers In Transportation	
HCS:	Unsignalized Intersection Release 2.1	Page 3
****	* * * * * * * * * * * * * * * * * * * *	*****

Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	31	136		34.2	E	10.0
EB	R	62	554		7.3	В	10.2
NB	L	68	705		5.7	В	0.4
		Int	ersection	n Delay =	0.8		

#### Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... DU51 5AI.HC0

Streets: (N-S) 51st Avenue

(E-W) Dusty Lane

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

#### Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	Т	R	P	T	R	L	T	R	Ŀ	T	R
No. Lanes Stop/Yield	0	1<	0 N	1	1	0 N	0	0	0	1>	0<	0
Volumes PHF	i	470 .95	25 .95	30 .95	385 .95					15 .95		25 .95
Grade	i	0		,	0			0		•	0	
MC's (%) SU/RV's (%)		0 0	0	0	0					. 0		0
CV's (%) PCE's		0 1.1	0 1.1	0	0 1.1					0 1.1		0 1.1

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor R	oad 6.00	3.30
Left Turn Minor Road	6.50	3.40

Center For Microcomputers In Transportation	n
HCS: Unsignalized Intersection Release 2.1	Page 2
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## WorkSheet for TWSC Intersection

•		
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	482 789 789 0.96	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	495 996 996 0.96	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	898 320	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.96 0.96	
due to Impeding Movements Movement Capacity: (pcph)	0.96 309	

Center For Microcomputers In Transportation	on
HCS: Unsignalized Intersection Release 2.1	Page 3
******************	*****

Move	ement	FlowRate v (pcph)			SharedCap Csh(pcph)	Avg.Tot	al	LOS	Delay By App
WB	L	18	309	>		>		>	
WB	R	29	789	>	495	>	8.0	<b>B</b> >	8.0
SB	Ĺ	35	996			3.7		A	0.3

Intersection Delay = 0.5

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1

File Name ..... DU51 5PI.HC0

Streets: (N-S) 51st Avenue (E-W) Dusty Lane

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 7/16/97

Other Information..... 2005 PM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

	No.	thbou		Southbound			Eastbound			Westbound		
	i											
	L	${f T}$	R	L	${f T}$	R	L	T	R	L	T	R
No. Lanes	0	1<	0	1	1.	. 0	0	0	0	1>	0<	0
Stop/Yield			N			N						
Volumes		530	25	30	535					15		25
PHF		.95	. 95	.95	.95				ļ	.95		.95
Grade		0			0			0	ĺ		0	
MC's (%)		0	0	0	0					0		0
SU/RV's (%)		0	0	0	0					0		0
CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1
										<u> </u>		

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

	Center For Microcomputers I	n	Transportation		
HCS:	Unsignalized Intersection Release	2	.1	Page .	2
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## WorkSheet for TWSC Intersection

~		
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	542 736 736 0.96	
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	555 932 932 0.96	
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1108 242	
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.96 0.96	
due to Impeding Movements Movement Capacity: (pcph)	0.96 233	

	Center	For Microcon	nputers In	Transportation	
HCS:	Unsignalized In	ntersection	Release 2	2.1	Page 3
****	******	*****	********	*****	*****

Mov	ement				SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	18	233	>	403	> 10.1	> C	10.1
WB	R	29	736	>		>	>	2012
SB	L	35	932			4.0	A	0.2

Intersection Delay = 0.5

#### Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... ES51\_5AI.HC0

Streets: (N-S) 51st Avenue

(E-W) Estrella Drive

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis.......... 7/16/97
Other Information......... 2005 AM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

						====	=====	====	=====	=====	=====	====
	Nor	thbou	nd	Sou	ıthbou:	nd	Eastbound			Westbound		
		Т	R	L	${f T}$	R	L	Т	R	L	${f T}$	R
No. Lanes	1	1<	0	1	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N			N						
Volumes	15	460	15	25	395	15	30	0	10	10	0	55
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	. 95
Grade		0	i		0	1		0 -			0	,
MC's (%)	0	0	0	0	0	0	0	0	ol	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	ol	0	Ō	Ō
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	468 802 802 0.92	402 866 866 0.99
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	475 1018 1018 0.97	410 1093 1093 0.98
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	918 360	918 360
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.96 344 1.00	0.96 344 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	915 313	938 303
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.96 0.97	0.96 0.97
due to Impeding Movements Movement Capacity: (pcph)	0.95 298	0.89 269

Center For Microcomputers In Transportatio	n
HCS: Unsignalized Intersection Release 2.1	Page 3
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Mov	ement	FlowRate v(pcph)	MoveCar Cm (pcpl		SharedCap Csh(pcph)	Avg.To	tal	LOS	Delay By App
EB	L	35	269	>	200	>		>	
EB	R	12	866	>	326	>	12.9	> >	12.9
WB	L	12	298	>		>		>	
WB	R	64	802	>	633	>	6.5	B >	6.5
NB SB	L L	18 29	1093 1018			3.3 3.6		A A	0.1 0.2

Intersection Delay = 1.0

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... ES51 5PI.HC0

(E-W) Estrella Drive Streets: (N-S) 51st Avenue

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis........... 7/16/97 Other Information........ 2005 PM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

=======================================												
	Nor	thbou	nd	Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1<	0	1	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N			N			l			
Volumes	15	535	15	25	570	15	30	0	10	10	0	55
PHF	.95	.95	.95	.95	.95	. 95	.95	.95	.95	.95	.95	.95
Grade		0	İ		0	İ		0	l		0	
MC's (%)	. 0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	. 0	0	0	0	0	0	0	0	0
CV's (%)	0	0	0	0	0	0	0	0	0 [	0	0	0
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

#### Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	542 736 736 0.91	578 705 705 0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	550 938 938 0.97	585 902 902 0.98
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	1168 266	1168 266
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.95 253 1.00	0.95 253 1.00
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1165 224	1188 217
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.95 0.96	0.95 0.96
due to Impeding Movements Movement Capacity: (pcph)	0.95 212	0.88 191

	Center	For Microc	omputers In	Transportation	
HCS:	Unsignalized I	ntersection	Release	2.1	Page 3
***	******	*****	*****	*****	****

Mov	ement	FlowRate v(pcph)	MoveCa Cm (pcp		SharedCap Csh(pcph)	Avg.To Delay	tal	LOS	Delay By App
EB	L	35	191	>	025	>		> ~	
EB	R	12	705	>	235	>	19.1	> C	19.1
WB	L	12	212	>	£20	>	7.0	> 5	<b></b>
WB	R	64	736	>	529	>	7.9	B >	7.9
NB SB	L L	18 29	902 938			4.1 4.0	•	A A	0.1

Intersection Delay = 1.1

#### Center For Microcomputers In Transportation HCS: Unsignalized Intersection Release 2.1

Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... EL51\_5AI.HC0

Streets: (N-S) 51st Avenue (E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 AM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

	Nor	Northbound		Southbound			Eastbound			Westbound		
	L	${f T}$	R	L	${f T}$	R.	L	${f T}$	R	L	T	R
No. Lanes	1	1<	0	1	1<	0	0>	1<	0	0>	1<	0
Stop/Yield			N			N						
Volumes	10	485	5	0	395	5	5	5	15	5	10	5
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade	•	0			0			0	Ī		0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

#### Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road Right Turn Minor Road	5.00 5.50	2.10
Through Traffic Minor Road Left Turn Minor Road	6.00	3.30 3.40

#### WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	488	398
Potential Capacity: (pcph)	784	870
Movement Capacity: (pcph)	784	870
Prob. of Queue-free State:	0.99	0.98
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	490	400
Potential Capacity: (pcph)	1001	1105
Movement Capacity: (pcph)	1001	1105
Prob. of Queue-free State:	1.00	0.99
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph)	898	898
Potential Capacity: (pcph) Capacity Adjustment Factor	369	369
due to Impeding Movements	0.99	0.99
Movement Capacity: (pcph)	365	365
Prob. of Queue-free State:	0.97	0.98
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	905	902
Potential Capacity: (pcph)	317	318
Major LT, Minor TH	<del></del> -	<b>-</b>
Impedance Factor:	0.97	0.96
Adjusted Impedance Factor:	0.98	0.97
Capacity Adjustment Factor		
due to Impeding Movements	0.96	0.96
Movement Capacity: (pcph)	303	305

Center For Microcomputers In Transportation	on
HCS: Unsignalized Intersection Release 2.1	Page 3
*********************	*****

Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)	Avg.Tot Delay	cal	LOS	Delay By App
EB EB EB	L T R	7 7 19		> >	516	> >	7.5	> > B >	7.5
WB WB WB	L T R	7 12 7	303 365 784	> >	401	> > >	9.6	> > B >	9.6
NB	L	12	1105			3.3		A	0.1

Intersection Delay = 0.4

Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 Page 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... EL51 5PI.HC0

Streets: (N-S) 51st Avenue (E-W) Elliot Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis...... 6/23/97
Other Information...... 2005 PM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

	======	=====								. <del></del>			
	Northbound			Sou	Southbound			Eastbound			Westbound		
	L L	T	R	L	T	R	L	T	R	L	T	R	
No. Lanes Stop/Yield	1	1<	0 N	1	1<	0 N	0>	1<	0	0>	1<	0	
Volumes	10	510	0	5	605	10	. 0	5	15	0	0	5	
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	
Grade		0	ļ		0			0	1		0		
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	510 764 764 0.99	610 680 680 0.97
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:	510 980 980 0.99	615 873 873 0.99
Step 3: TH from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Capacity Adjustment Factor	1140 275	1135 277
due to Impeding Movements Movement Capacity: (pcph) Prob. of Queue-free State:	0.98 269 1.00	0.98 271 0.97
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH	1145 230	1138 232
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor	0.95 0.96	0.98
due to Impeding Movements Movement Capacity: (pcph)	0.94 216	0.98 226

### Intersection Performance Summary

Mov	ement	FlowRate v(pcph)			SharedCap Csh(pcph)		al	LOS	Delay By App
EB EB	T R	7 19	271 680	-	484	> >	7.9	> > B	7.9
WB	R	7	764	>	764	>	4.8	> A	
NB SB	L L	12 7	873 980			4.2 3.7		A A	0.1

Intersection Delay = 0.2

Center For Microcomputers In Transportation 

File Name ..... DO51\_5AI.HC0

Streets: (N-S) 51st Avenue (E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis...... 6/23/97
Other Information...... 2005 AM Peak Hour-Pk Season-Improved Geometry

#### All-way Stop-controlled Intersection

	Northbound			Southbound			Ea	.stbou	nd	Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
_												
No. Lanes	1	1	1 {	1	1<	0	1	1<	0	1	1<	0
Volumes	20	405	75	50	345	10	20	70	20	75	50	75
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0			0			0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0
CV's (%)	13	13	13	13	13	13	13	13	13	13	13	13
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
									•			

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate	22	56	22	84
RT Flow Rate	84	11	22	84
Approach Flow Rate	561	455	123	224
Proportion LT	0.04	0.12	0.18	0.38
Proportion RT	0.15	0.02	0.18	0.38
Opposing Approach Flow Rate	455	561	224	123
Conflicting Approaches Flow Rate	347	347	1016	1016
Proportion, Subject Approach Flow Rate	0.41	0.33	0.09	0.16
Proportion, Opposing Approach Flow Rate	0.33	0.41	0.16	0.09
Lanes on Subject Approach	3	2	2	2
Lanes on Opposing Approach	2	3		2
LT, Opposing Approach	56	22	84	22
RT, Opposing Approach	11	84	84	22
LT, Conflicting Approaches	106	106	78	78
RT, Conflicting Approaches	106	106	95	95
Proportion LT, Opposing Approach	0.12	0.04	0.38	0.18
Proportion RT, Opposing Approach	0.02	0.15		0.18
Proportion LT, Conflicting Approaches	0.31	0.31	0.08	0.08
Proportion RT, Conflicting Approaches	0.31	0.31	0.09	0.09
Approach Capacity	1013	740	373	415

	Center For Microcomputers In Transpo	ortation
HCS:	Unsignalized Intersection Release 2.1	Page 3
****	*************	*****

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
ND	F 61	1010			
NB	561	1013	0.55	8.2	В
SB	455	740	0.61	10.3	С
EB	123	373	0.33	3.5	A
WB	224	415	0.54	7.8	В

Intersection Delay = 8.42
Level of Service (Intersection) = B

File Name ..... DO51\_5PI.HC0

Streets: (N-S) 51st Avenue (E-W) Dobbins Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 PM Peak Hour-Pk Season-Improved Geometry

## All-way Stop-controlled Intersection

	Northbound		ınd	Southbound			Eastbound			Westbound		
	L	${f T}$	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	1	1<	0	1	1<	0	1	1<	0
Volumes	20	455	35	45	520	15	15	45	25	50	50	40
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
Grade		0			0	.		0	}		0	
MC's (%)	0	0	0	0	0	0	0	0	0	0	0	0
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	Ô
CV's (%)	8	8	8	8	8	8	8	8	8	8	8	8
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate RT Flow Rate Approach Flow Rate Proportion LT Proportion RT Opposing Approach Flow Rate Conflicting Approaches Flow Rate Proportion, Subject Approach Flow Rate Proportion, Opposing Approach Flow Rate Lanes on Subject Approach Lanes on Opposing Approach LT, Opposing Approach LT, Opposing Approach RT, Opposing Approach LT, Conflicting Approaches RT, Conflicting Approaches Proportion LT, Opposing Approach Proportion LT, Conflicting Approach Proportion LT, Conflicting Approaches	22 39 572 0.04 0.07 652 253 0.39 0.44 3 2 51 17 73 73 0.08 0.03 0.29	572 253 0.44 0.39 2 3 22 39 73 73 0.04 0.07 0.29	157 1224 0.06 0.11 2 56 45 73 56 0.36 0.29 0.06	56 45 157 0.36 0.29 96 1224 0.11 0.06 2 2 17 28 73 56 0.18 0.29 0.06
Proportion RT, Conflicting Approaches Approach Capacity	0.29 1078	0.29 815	0.05 286	0.05 353

Center For Microcomputers In Transportation	
HCS: Unsignalized Intersection Release 2.1	Page 3
*********************	****

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	LOS
NB	*	*	*	*	*
SB	*	*	*	*	*
EB	*	*	*	*	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Dobbins Road

(N-S) 51st Avenue

Analyst: Kirkham Michael

File Name: DO51\_5AI.HC9

Area Type: Other

4-1-97 AM Peak

Comment: 2005 Total Traffic (improved geometry)

========	======	=====	=====	====	====	====:	=====	=====	=====	====	===	
	•	astbo		l .	stbou		I .	rthbo		So	uthbo	und
•	L	T	R 	L 	T 	R	L	T	R	L	T	R
No. Lanes	ı —	1 .		1		<	1	1	1	1	1 .	<
Volumes Lane Widt	20 h   12.0		20		50 12.0	75	4	405	75	1	345	10
RTOR Vols		12.0	0	12.0	12.0	0	12.0	12.0	12.0	12.0	12.0	0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00		3.00	3.00	3.00
				Sign	al Ope	eratio	ons					
Phase Com	binatic		2	3	_	4		!	5	6	7	8
EB Left		*				NB	Left	_ ;	*			
Thru		*				l	Thr		k			
Right		*				Ţ	Rigl	nt :	k			
Peds		*				1	Peds		*			
WB Left		*				SB	Left	۰ -	k			
Thru		*					Thru	1 <sup>1</sup>	k			
Right		*					Rigl	nt ;	k			
Peds		*					Peďs		k			
NB Right						EB	Rigl	nt				
SB Right						WB	Righ					
Green	1	7.0A				Gre	een	65.0	DΑ			
Yellow/AR		4.0				Ye]	Llow/A					
Cycle Len	gth: 9	0 secs	s Pha	ase co	ombina		ordei					

	Tana	Cacun	Intersect			Summary			
	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approac Delay	LOS
EB	L	185	927	0.119	0.200	19.1		10 0	
	TR	325	1626	0.311	0.200	20.0	C	19.9	С
WB	L	227	1133	0.371	0.200	20.6	Č	21.0	С
	TR	306	1530	0.458	0.200	21.3	C		
NB	L	447	610	0.049	0.733	2.1	A	2.8	Α
	${f T}$	1233	1681	0.369	0.733	2.9	A		
	R	1048	1429	0.080	0.733	2.2	A		
SB	$\Gamma$	358	488	0.156	0.733	2.4	A	2.7	Α
	TR	1228	1674	0.325	0.733	2.8	Α		
Lost	Time/C	Inte Cycle, L	ersection I = 6.0 se	Delay = ec Crit	7.3 se ical v/	c/veh In c(x)	tersect = 0.388		= B

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Dobbins Road (N-S) 51st Avenue
Analyst: Kirkham Michael File Name: DO51\_5PI.HC9
Area Type: Other 4-1-97 PM Peak
Comment: 2005 Total Traffic (improved geometry)

Comment: 20	05 Total Tr	affic ( 	(improv	ed geor	metry)	)				
	Eastbou	ſ	Westbo		1	rthbo	und	So	===== uthbo	===== und
	L T	R   I	. Т	R 	L	T 	R	L	T	R
No. Lanes	1 1 <	1		<	1	1	1	1		<
Volumes Lane Width	15 45 12.0 12.0	25	50 5 2.0 12.			455 12.0	35 12.0			15
RTOR Vols		0		0			0			0
Lost Time	3.00 3.00	3.00 3. 	0.6 00	0 3.00 	3.00 	3.00	3.00	3.00 	3.00 	3.00
Dhana Gambi			gnal O		ons					٠.
Phase Combi EB Left	nation 1 *	2	3	4 NB	Left		5 <b>k</b>	6	7	8
Thru	*				Thru	1 7	k			•
Right Peds	*				Righ Peds		k k			
WB Left	*			SB	Left	_ *	k			
Thru Right	*				Thru Righ					
Peds	*				Peds	3 7	ł .			
NB Right SB Right				EB WB	Righ Righ					
Green	17.0A			Gre	een	65.0		•		
Yellow/AR Cycle Lengt	4.0 h: 90 secs	Phase	combi		llow/ <i>F</i> order					
							·			

	_	_	Intersect:			Summary			
	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approac Delay	ch: LOS
EB									
EB	L	227	1133	0.075	0.200	18.9	C	19.5	_ C
	$\mathtt{TR}$	319	1593	0.248	0.200	19.7	С		
WB	L	253	1265	0.221	0.200	19.5	С	19.9	С
	TR	314	1568	0.322	0.200	20.1	С		
NB	L	225	307	0.098	0.733	2.2	Α	3.0	A
	T	1233	1681	0.415	0.733	3.1	A		
•	R	1048	1429	0.037	0.733	2.1	Α		
SB	L	295	402	0.173	0.733	2.4	Α	3.4	A
	TR	1228	1674	0.490	0.733	3.5	Α		
		Inte	ersection I	Delay =	6.0 se	c/veh Int	ersect	tion LOS	= B
Lost	Time/	Cvcle. L	= 6.0 se	ec <sup>-</sup> Crit	rical v/		- 0 454		

File Name ..... BA51 5AI.HC0

Streets: (N-S) 51st Avenue (E-W) Baseline Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 AM Peak Hour-Pk Season-Improved Geometry

#### All-way Stop-controlled Intersection

	Nor	thbou	nd	Sou	thbou	nd	Eastbound			Westbound			
İ	L	T	R	L	${f T}$	R	L	T	R	L	T	R	
No. Lanes	1	2<	0	1	1	1	1	1<	0	1	1<	0	
Volumes	45	460	80	105	345	45	50	180	55	45	100	75	
PHF	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89	
Grade		0			0			0			0		
MC's (%)	0	. 0	0	0	0	0	0	0	0	0	0	0	
SU/RV's (%)	0	0	0	0	0	0	0	0	0	0	0	0	
CV's (%)	0	0	0	0	0	0	0	0	0	0	0	.0	
PCE's	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	

Volume Summary and Capacity Anal	lysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate	51	118	56	51
RT Flow Rate	90	51	62	84
Approach Flow Rate	658	557	320	247
Proportion LT	0.08	0.21	0.17	0.21
Proportion RT	0.14	0.09	0.19	0.34
Opposing Approach Flow Rate	557	658	247	320
Conflicting Approaches Flow Rate	567	567	1215	1215
Proportion, Subject Approach Flow Rate	0.37	0.31	0.18	0.14
Proportion, Opposing Approach Flow Rate	0.31	0.37	0.14	0.18
Lanes on Subject Approach	3	3	2	·2
Lanes on Opposing Approach	3	3	2	2
LT, Opposing Approach	118	51	51	56
RT, Opposing Approach	51	90	84	62
LT, Conflicting Approaches	107	107	169	169
RT, Conflicting Approaches	146	146	141	141
Proportion LT, Opposing Approach	0.21	0.08	0.21	0.17
Proportion RT, Opposing Approach	0.09	0.14	0.34	0.19
Proportion LT, Conflicting Approaches	0.19	0.19	0.14	0.14
Proportion RT, Conflicting Approaches	0.26	0.26		0.12
Approach Capacity	863	896	476	444

## Intersection Performance Summary

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	· Average Total Delay	LOS
375					
NB	658	863	0.76	18.1	C
SB	557	896	0.62	10.6	C
EB	*	*	*	*	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

File Name ..... BA51\_5PI.HC0

Streets: (N-S) 51st Avenue (E-W) Baseline Road

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 PM Peak Hour-Pk Season-Improved Geometry

## All-way Stop-controlled Intersection

=========									'	•		
	Nor L	thbou T	nd R	Sou L	thbou T	nd R	Ea Ea	stbou:	nd R	Wes	tboung	==== d R
No. Lanes Volumes PHF Grade MC's (%)	1 40 .89	2< 455 .89 0	0 55 .89	1 100 .89	1 520 .89 0	1 85 .89	1 50 .89	1< 120 .89	0 65 .89	1 70 .89	1< 165 .89	0 85 .89
SU/RV's (%) CV's (%) PCE's	0 0 1.1	0 0 1.1	0 0 0 1.1	0 0 0 1.1	0 0 1.1	0 0 0 1.1	0 0 0 1.1	0 0 0 1.1	0 0 0 1.1	0 0 1.1	0 0 0 1.1	0 0 0 1.1

Volume Summary and Capacity Anal	ysis Work	Sheet		
	NB	SB	EB	WB
LT Flow Rate	45	112	56	79
RT Flow Rate	62	96	73	96
Approach Flow Rate	618	792	264	360
Proportion LT	0.07	0.14	0.21	0.22
Proportion RT	0.10	0.12	0.28	0.27
Opposing Approach Flow Rate	792	618	360	264
Conflicting Approaches Flow Rate	624	624	1410	1410
Proportion, Subject Approach Flow Rate	0.30	0.39	0.13	0.18
Proportion, Opposing Approach Flow Rate	0.39	0.30	0.18	0.13
Lanes on Subject Approach	3	3	2	2
Lanes on Opposing Approach	3	3	2	2
LT, Opposing Approach	112	45	79	56
RT, Opposing Approach	96	62	96	73
LT, Conflicting Approaches	135	135	157	157
RT, Conflicting Approaches	169	169	158	158
Proportion LT, Opposing Approach	0.14	0.07	0.22	0.21
Proportion RT, Opposing Approach	0.12	0.10	0.27	0.28
Proportion LT, Conflicting Approaches	0.22	0.22	0.11	0.11
Proportion RT, Conflicting Approaches	0.27	0.27	0.11	0.11
Approach Capacity	875	917	441	460

	Center For	Microcomputers	In Transpo	ortation
HCS:	Unsignalized Inter	section Relea	se 2.1	Page 3
****	********	*****	*****	

Movement	Approach Flow Rate	Approach Capacity	V/C Ratio	Average Total Delay	Los
NB	618	875	0.71	14.7	С
SB	792	917	0.86	26.7	D
EB	*	*	• · · · · ·	20.7	ъ *
			•	^	*
WB	*	*	*	*	*

Intersection Delay = \*
Level of Service (Intersection) = \*

<sup>\*</sup>The range limits on this approach exceed the maximum.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Baseline Road (N-S) 51st Avenue

Analyst: Kirkham Michael File Name: BA51\_5AI.HC9 Area Type: Other 4-1-97 AM Peak

Comment: 2005 Total Traffic (improved geometry)

========	========	=====	_====	- =====:	====:	=====	====	====	====	=====	====	
	Eastbo	und	We	stbour	nd	No:	rthbo	und	So	uthbo	und	
	L T	R	L	T	R	Ŀ	T	R	L	T	R	
No. Lanes	1 1							,-				
Volumes	50 180	< 55	1 45		< 75	45	2 460	< 80	105	1 345	1 45	
Lane Width	12.0 12.0		12.0		75	12.0		80	1	12.0		
RTOR Vols		0			0	12.0	12.0	0	12.0	12.0	0	
Lost Time	3.00 3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00		
	Signal Operations											
Phase Combi	nation 1	2	3	4			Ţ	5	6	7	8	
EB Left	*				NB	Left	_ ;	*				
Thru	*					Thru		k				
Right	*				į	Rigl		*				
Peds	*					Peds	-	<b>k</b>			•	
WB Left	*				SB	Left		<b>k</b> .				
Thru	*					Thru		* *				
Right Peds	*					Righ Peds		* *				
NB Right					EB	Righ		•			*	
SB Right					WB	Righ						
Green	30.0A				1	een	52.0	DΑ				
Yellow/AR	4.0				1	llow/A						

Cycle Length: 90 secs Phase combination order: #1 #5

	Lane	Group:	Intersect Adj Sat	ion Perf v/c	ormance g/C	Summary		Annroa	ah.
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Approa Delay	LOS
							***		
EB	L	297	861	0.189	0.344	13.4	В	15.1	C
	TR	559	1623	0.472	0.344	15.4	C		
WB	L	224	651	0.227	0.344	13.6	В	14.3	В
	TR	542	1573	0.362	0.344	14.5	В		
NB	L	336	571	0.152	0.589	5.4	В	6.1	В
	TR	1936	3287	0.329	0.589	6.1	В		
SB	L	287	488	0.411	0.589	7.0	В	6.5	В
	T	990	1681	0.392	0.589	6.5	В		
	R	842	1429	0.061	0.589	5.1	В		
		Int	ersection	Delay =	8.9 se	c/veh Int	cersect	tion LOS	= B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.433

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Analyst: Ki Area Type:	Streets: (E-W) Baseline Road (N-S) 51st Avenue Analyst: Kirkham Michael File Name: BA51_5PI.HC9 Area Type: Other 4-1-97 PM Peak Comment: 2005 Total Traffic (improved geometry)										
=========	Eastbour	-==== ad	==== Woo	===== stbour	====:	=====	====== cthbour	=== .a	====:	====:	====
	L T		L L		R	L INO	T	R	L	uthboi T	ina R
No. Lanes	1 1 <	1	1	1 <		1			1	1	1
Volumes	50 120			165	85		455		1	520	85
Lane Width RTOR Vols	12.0 12.0	0 1	2.0	12.0	0	12.0	12.0	0	12.0	12.0	12.0
Lost Time	3.00 3.00 3	- 1	.00	3.00		3.00	3.00 3		3.00	3.00	
Signal Operations											
Phase Combi	nation 1	2	3	4			5		6	7	8
EB Left	*				NB	Left					
Thru	*					Thru					
Right	*		-			Righ					
Peds WB Left	*					Peds					•
WB Left Thru	*				SB	Left					
Right	*				-	Thru Righ					
Peds	*					Peds					
NB Right					EB						
SB Right	,				WB	_				•	
Green	30.0A				Gre	een	52.0A				
Yellow/AR	4.0						AR 4.0				
Cycle Lengtl	h: 90 secs	Phase	e cc	ombina	tion	order	: #1 #	5			
	Intersection Performance Summary										

			Todana	: D					
	Lane Mvmts	Group: Cap	Intersect Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approac Delay	ch: LOS
EB	L	209	607	0.268	0.344	13.9	В	14.5	В
	TR	549	1593	0.379	0.344	14.6	В		
WB	${f L}$	283	821	0.279	0.344	14.0	В	15.4	С
	TR	550	1596	0.511	0.344	15.8	C		
NB	L	158	268	0.285	0.589	6.2	В	6.0	В
	TR	1947	3307	0.309	0.589	6.0	В		
SB	L	312	529	0.360	0.589	6.6	В	7.6	В
	${f T}$	990	1681	0.590	0.589	8.2	В		
	R	842	1429	0.114	0.589	5.3	В		
		Inte	ersection I	Delay =	9.4 sec	c/veh Int	ersect	cion LOS	= B
Lost	Time/	Cycle, L	= 6.0 se	ec Crit	cical v/c	c(x) =	0.563		

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue (N-S) 51st Avenue

Analyst: Kirkham Michael File Name: SO51\_5AI.HC9
Area Type: Other 6-23-97 AM Peak

Comment: 2005 Pk Season w/Casino, Imp. Geometry

	Eastbou	nd	Westbou	nd	l Nor	rthbound	3   5	Southbou	hai		
	L T	RL		R	L		_ 1		-		
		.	-	IX.	٦ ا	1 1	R   L	${f T}$	R		
)											
No. Lanes	1 1 <	1	1	<	1	2 <	1	2	1		
Volumes	30 110	15	25 50	95	15	480	30 16	0 425	15		
Lane Width	12.0 12.0		.0 12.0		J	12.0		0 12.0			
RTOR Vols		0 2	.0 12.0		12.0	12.0		0 12.0			
	12 00 2 00			0			0		0		
Lost Time	3.00 3.00	3.00 3.	00 3.00	3.00	3.00	3.00 3.	.00 3.0	00 3.00	3.00		
		Si	gnal Op	eratio	ons						
Phase Combi	nation 1	2		4		5	6	7	8		
EB Left	*	-		- 1	T ~ £+	· <del>-</del>	*	,	0		
Thru	*			NB	Left						
					Thru		*				
Right	*				Righ	ıt	*				
Peds	* .				Peds	3	*				
WB Left	*			SB	Left		*				
Thru	*				Thru		*				
Right	*			į							
					Righ		*				
Peds	*				Peds	3	*				
NB Right				EB	Righ	ıt					
SB Right				WB	Righ						
Green	30.0A			1	een		40.0A				
Yellow/AR	4.0										
		<b>1</b>				AR 4.0	4.0				
Cycle Lengt	h: 90 secs	Phase	combina	ation	order	: #1 #5	#6				

0,010	20119 011	. )	BCCB	rnase	COMMINACTOR	orger:	#1	#3	# 0		
	_		Inte	rsectio	n Performanc	e Summ	ary				

	Lane	Group:	Adj Sat	v/c	g/C	_		Approac	ch:
	Mvmts	Cap	${ t Flow}$	Ratio	Ratio	Delay	LOS	Delay	LOS
EB	L	316	918	0.108	0.344	13.0	В	13.6	В
	$\mathtt{TR}$	569	1651	0.248	0.344	13.7	В		
WB	L	343	996	0.082	0.344	12.9	В	13.9	В
	TR	522	1515	0.312	0.344	14.1	В		
NB	L	254	. 558	0.067	0.456	8.9	В	10.6	В
	TR	1518	3333	0.396	0.456	10.6	В		
SB	L	336	1597	0.536	0.233	7.4	В	6.2	В
	${f T}$	1980	3363	0.253	0.589	5.8	В		
	R	842	1429	0.020	0.589	5.0	A		
		Into	ercection	Dolass -	0 4 000	a/rech Int		TOC	ħ

Intersection Delay = 9.4 sec/veh Intersection LOS = B Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.432

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4a 09-12-1997

Kirkham, Michael & Associates

Streets: (E-W) Southern Avenue (N-S) 51st Avenue

Analyst: Kirkham Michael File Name: SO51 5PI.HC9
Area Type: Other 6-23-97 PM Peak

Comment: 2005 Pk Season with Casino, Imp. Geometry

=======================================													
		Ea	astbo	und	Westbound			No	rthbo	und	Southbound		
•		L	T	R	L	T	R	L	T	R	L	T	R
No. Lan Volumes Lane Wi RTOR Vo	dth ls	1 30 12.0		20	1 50 12.0	1 175 12.0	130		490 12.0	30 3.00	12.0		0
Signal Operations													
Phase C		nation		2	. 3	_	4			5	6	7	8
EB Lef			*				NB	Left		*			
Thr Rig			*				1	Thru		* *			
Ped			*					Righ Peds		*			
WB Lef			*				SB	Left		*			,
Thr	u		*					Thru		*			
Rig			*		*			Righ		*			
Ped			*					Peds		*			
NB Rig SB Rig							EB	Righ					
SB Rig	111						WB	Righ	ıt				

Green 30.0A Yellow/AR 4.0 Yellow/AR 4.0 Cycle Length: 90 secs Phase combination order: #1 #5

	Lane											
	Mvmts	Cap	Flow	Ratio	Ratio	Delay	LOS	Approa Delay	LOS			
EB	L	168	487	0.203	0.344	13.5	В	13.3	В			
	TR	583	1693	0.153	0.344	13.2	В					
WB.	L	452	1311	0.124	0.344	13.1	В	16.5	Ć			
	TR	567	1646	0.605	0.344	17.1	С					
NB	L	250	424	0.088	0.589	5.2	В	6.0	В			
	TR	2053	3487	0.299	0.589	6.0	B					
SB	L	317	538	0.442	0.589	7.3	В	6.4	В			
	${f T}$	2072	3519	0.350	0.589	6.2	В		-			
	R	880	1495	0.039	0.589	5.0	A					
		Inte	ersection	Delay =	8.6 se	c/veh Int	ersect	tion LOS	= B			

Green 52.0A

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.502

## Center For Microcomputers In Transportation

HCS: Unsignalized Intersection Release 2.1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

File Name ..... BR51\_5AI.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis...... 6/23/97
Other Information...... 2005 AM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

	Nor	thbou	ind	Sou	thbou	==== nd	Eas	==== stbou	nd	===== West	bound	:==== }
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes Stop/Yield	1	2	0 <b>N</b>	0	2<	0 N	1	0	1	0	0	0
Volumes PHF	40 .89	575 .89			510 .89	30 .89	70 .89		105			
Grade MC's (%)	0	0			0 0	0	0	0	0		0	
SU/RV's (%) CV's (%) PCE's	0 13 1.1	13			0 13	13	0 13		13			
		1.1			1.1 	1.1	1.1		1.1			

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

# 

### WorkSheet for TWSC Intersection

		. <b></b>
Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		270 1010 1010 0.87
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		540 879 879 0.94
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		1140 198
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.94 0.94
due to Impeding Movements Movement Capacity: (pcph)		0.94 187

Center For Microcomputers In Transportation	
HCS: Unsignalized Intersection Release 2.1	Page 3
*********************	*****

# Intersection Performance Summary

Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	87	187		35.7	E	
EB	R	130	1010		4.1	A	10.2
NB	L	50	879		4.3	A	0.3
		Tni	tersection	n Delav =	1 6		

Center For Microcomputers In Transportation

File Name ..... BR51\_5PI.HC0

Streets: (N-S) 51st Avenue

(E-W) Broadway Road

Major Street Direction.... NS

Length of Time Analyzed... 60 (min)

Analyst..... Kirkham Michael

Date of Analysis..... 6/23/97

Other Information...... 2005 PM Peak Hour-Pk Season-Improved Geometry

#### Two-way Stop-controlled Intersection

	=====	=====	====	=====	=====	=====	=====	=====	=====	=====	=====	====
	Nor	thbour	nd	Sou	thbour	nd	Eas	stbour	nd	West	bound	
	L	${f T}$	R	L	${f T}$	R	L	T	R	L	T	R
No. Lanes	1	2	0	0	2<	0	1	0	1	0	0	0
Stop/Yield			N			N			ŀ			
Volumes	55	625		•	760	50	25		50			
PHF	.89	.89			.89	.89	.89		.89			
Grade		0 -			0			0	1		0	
MC's (%)	0	0			0	0	0		0			
SU/RV's (%)	0	0			0	0	0		0	,		
CV's (%)	8	8	İ		8	8	8		8	•		
PCE's	1.1	1.1	-		1.1	1.1	1.1		1.1			

#### Adjustment Factors

Vehicle	Critical	Follow-up
Maneuver	Gap (tg)	Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	7.00	3.40

#### 

## WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	. WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		405 863 863 0.93
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph) Potential Capacity: (pcph) Movement Capacity: (pcph) Prob. of Queue-free State:		810 630 630 0.89
Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph) Potential Capacity: (pcph) Major LT, Minor TH		1465
Impedance Factor: Adjusted Impedance Factor: Capacity Adjustment Factor		0.89 0.89
due to Impeding Movements Movement Capacity: (pcph)	·	0.89 109

	Center For Microcomputers In Tran	nsportation
	Unsignalized Intersection Release 2.1	Page 3
***	************************	******

# Intersection Performance Summary

Mov	ement			SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
EB	L	31	109		46.0	F	
EB	R	62	863		4.5	A	10.2
NB	L	68	630		6.4	. <b>B</b>	0.5
1		Int	tersection	n Delav =	0.9		•

 $c_{m,l}$  = movement capacity of left-turn movement in shared lane (pcph);

 $c_{m,i}$  = movement capacity of through movement in shared lane (pcph); and

 $c_{m,r}$  = movement capacity of right-turn movement in shared lane (pcph).

Only those movements included in the shared lane are included in the equation. If the shared lane includes only right-turn and through movements, both numerator and denominator terms for left-turners are deleted in the equation.

It is important to remember that the methodology implicitly assumes that an exclusive lane is provided to all left-turning traffic from the major street. In situations on a single-lane major street approach where a left-turn lane is not provided, it is possible for major street through (and possibly right-turning) traffic to be delayed by left-turning vehicles waiting for an acceptable gap. To account for this possibility, the factors  $p^*_{0,1}$  and  $p^*_{0,4}$  may be computed as an indication of the probability that there will be no queue in the respective major street shared lanes:

$$p^*_{0,j} \approx 1 - \frac{1 - p_{0,j}}{1 - \left[\frac{V_A}{s_B} + \frac{V_{I2}}{s_{I2}}\right]}$$
 (10-10)

when

j = 1.4 (major street left-turning traffic streams);

i1 = 2.5 (major street through traffic streams);

i2 = 3,6 (major street right-turning traffic streams);

 $s_n$  = saturation flow rate for major street through traffic streams (vph) (this parameter can be measured in the field);

 $s_0$  = saturation flow rate for major street right-turning traffic (vph) (this parameter can be measured in the field); and  $V_c = 0$  if an exclusive right-turn lane is provided.

By using  $p_{0,1}^*$  and  $p_{0,4}^*$  instead of  $p_{0,1}$  and  $p_{0,4}$  (as computed from Equation 10-3), the additional influence of the potential for queues on a major street with shared left-turn lanes may be properly taken into account.

#### LEVEL OF SERVICE CRITERIA

The level of service criteria are given in Table 10-3. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the

TABLE 10-3. LEVEL OF SERVICE CRITERIA FOR TWSC INTERSECTIONS

LEVEL OF SERVICE	AVERAGE TOTAL DELAY (SEC/VEH)
<b>A</b>	≤5
В	>5 and ≤10
С	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤45
F	>45

degree of saturation. In situations where the degree of saturation is greater than about 0.9, the amount of average total delay is also dependent on the length of the analysis period. For a 15-min analysis period, an estimate of average total delay is given by the following equation:

$$D = \frac{3600}{c_{m,t}} + 900T \left[ \frac{V_t}{c_{m,t}} - 1 + \sqrt{\left(\frac{V_t}{c_{m,t}} - 1\right)_2 + \frac{\left(\frac{3600}{c_{m,t}}\right)\left(\frac{V_t}{c_{m,t}}\right)}{450T}} \right]$$
 (10-11)

where

D = average total delay (sec/veh);

 $V_z$  = volume for movement x, expressed as an hourly flow rate;  $c_{x,z}$  = capacity of movement x, expressed as an hourly flow rate;

T =analysis period (hr) (for a 15-min period, use T = 0.25).

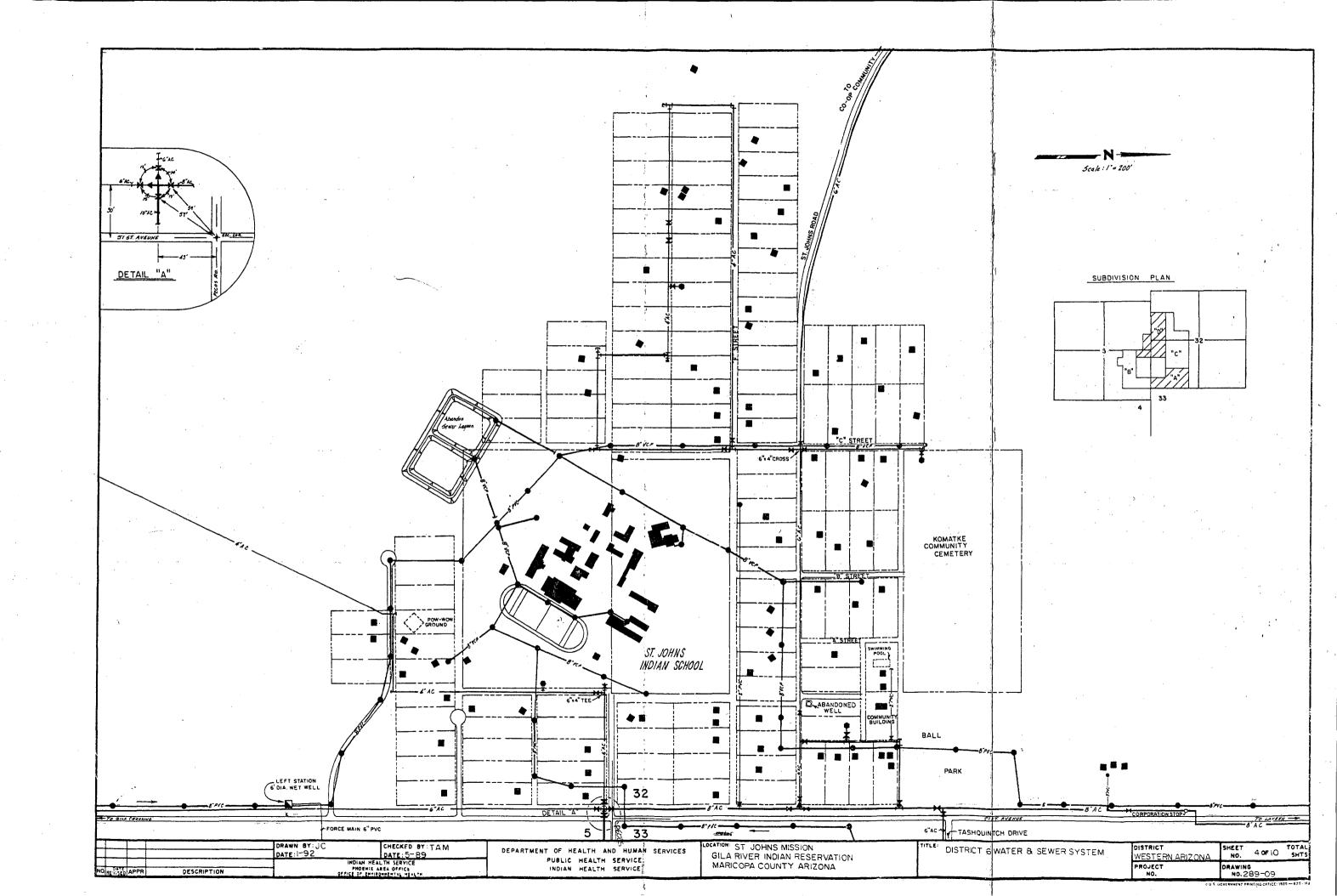
This equation is depicted graphically in Figure 10-7 for a discrete range of capacities and a 15-min analysis time period.

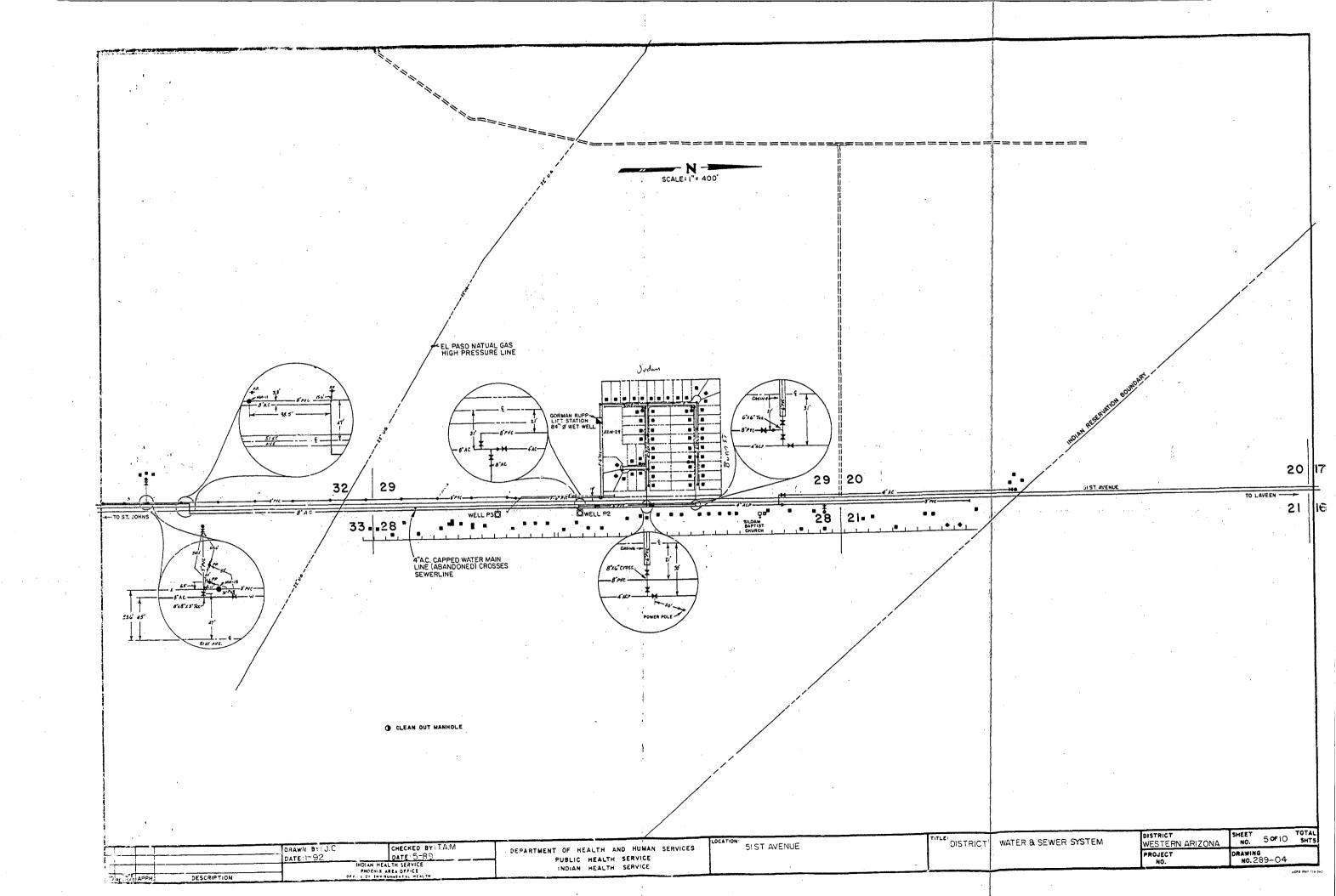
Average total delay less than 5 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so this range is appropriate. To remain consistent with the AWSC intersection analysis procedure described later in this chapter, a total delay of 45 sec/veh is assumed as the break point between LOS E and F.

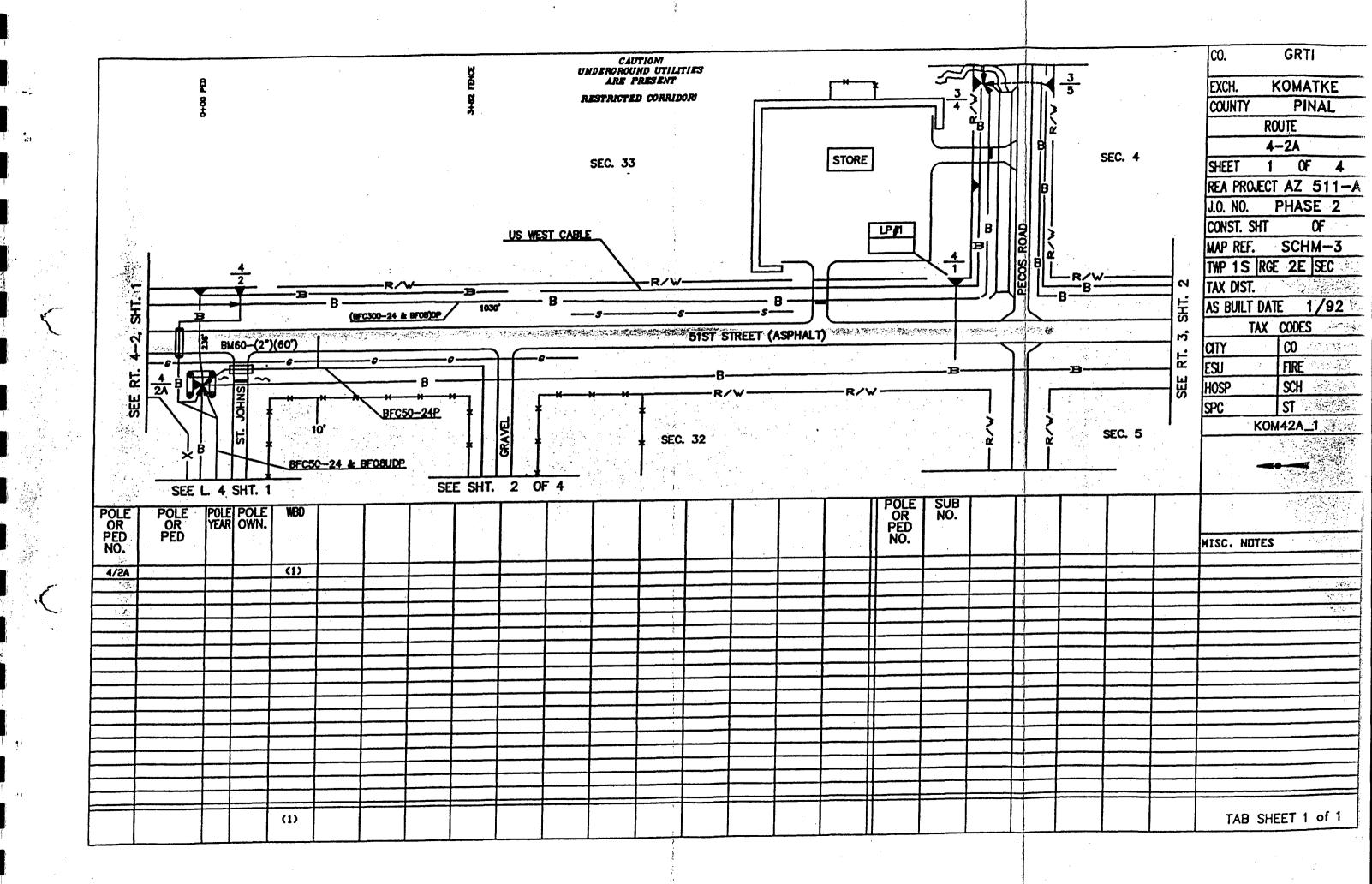
The proposed level of service criteria for TWSC intersections are somewhat different from the criteria used in Chapter 9 for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, whereas drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

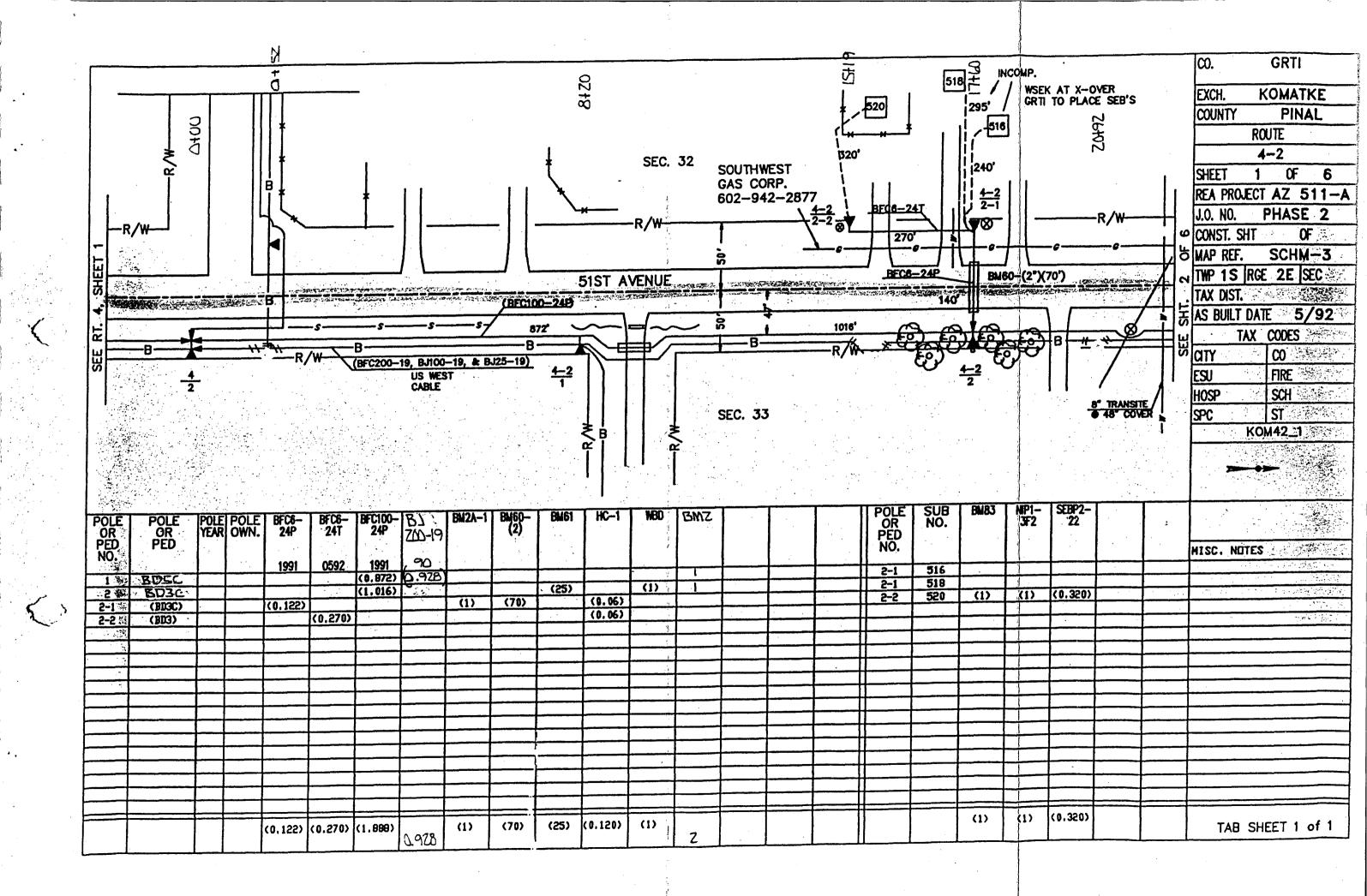
A movement, most often a left-turn movement, can sometimes have a poorer level of service if it is given a separate lane than if it shares a lane with another movement (usually a through movement). This is not inconsistent in terms of the stated criteria. Left-turn movements will generally experience longer total delays than other movements because of the nature and priority of the movement. If left turns are placed in a shared lane, the average total delay to vehicles in that lane may indeed be less than the average total delay to left turns in a separate lane. However, all vehicles in the shared lane experience increased total delay over the condition in which left turns have a separate lane. Consider the following:

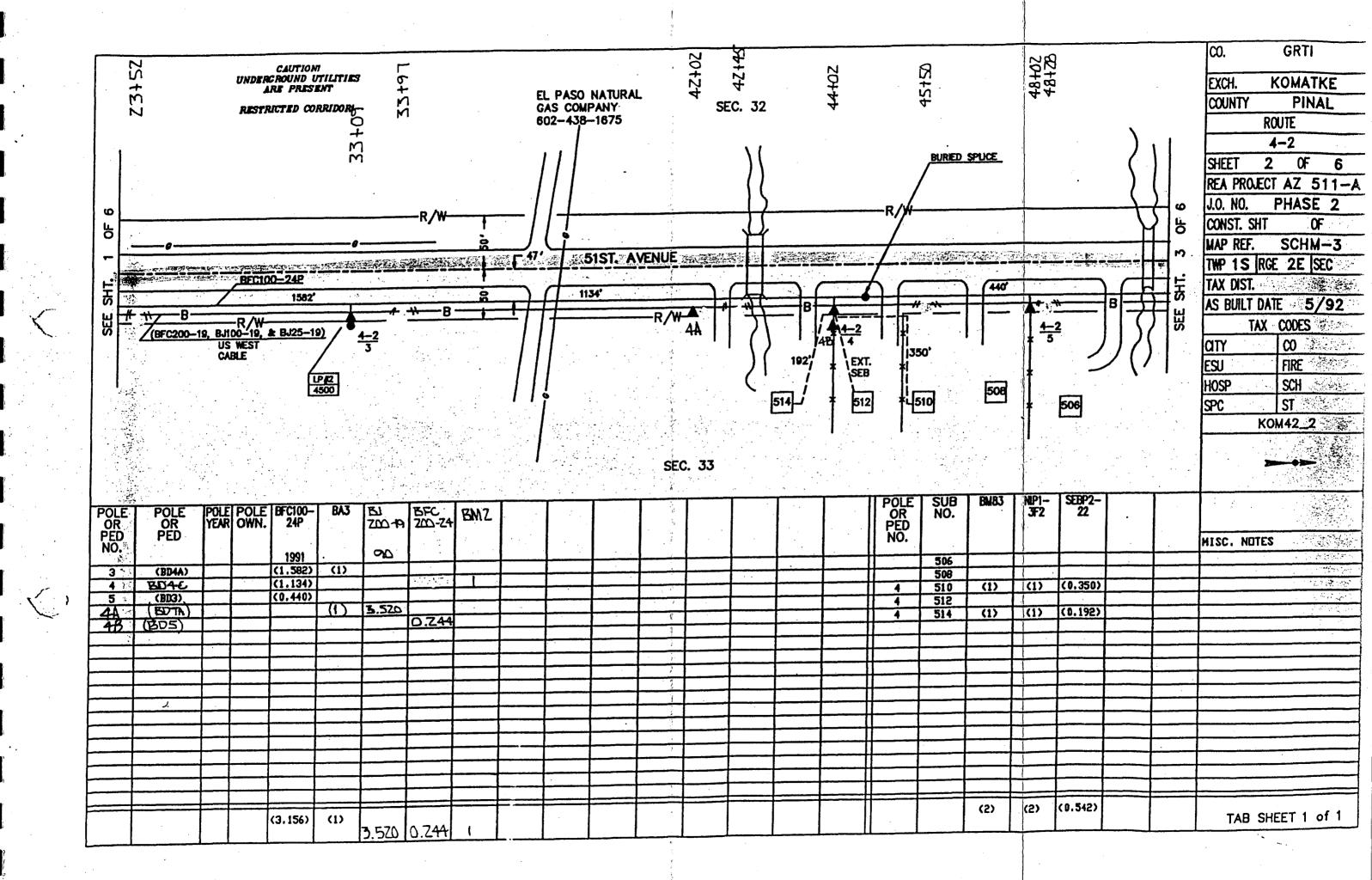
1. Ten left-turners will experience an average total delay of 10 sec if they have an exclusive lane and of 15 sec if they share a lane with a through movement.

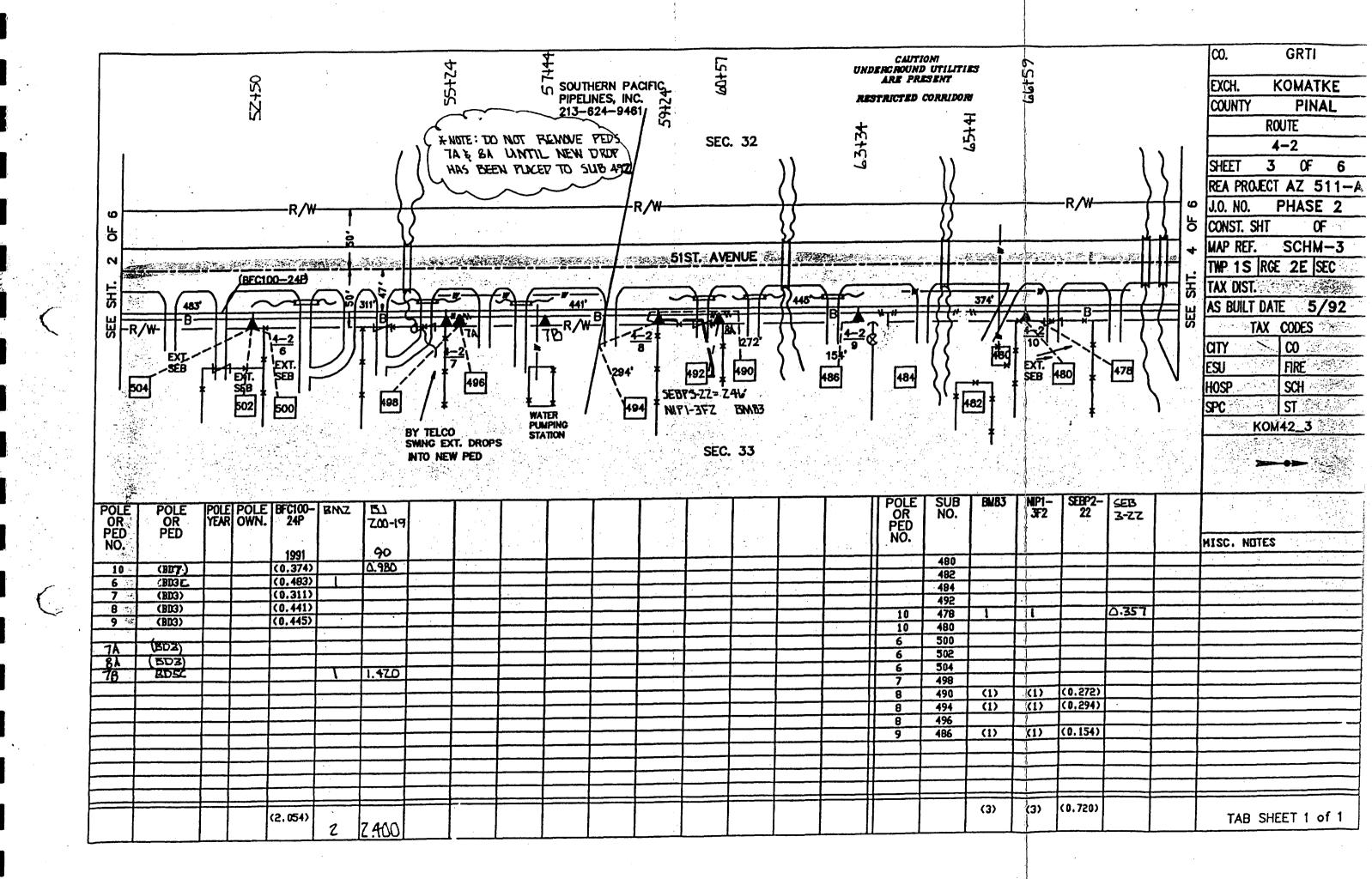


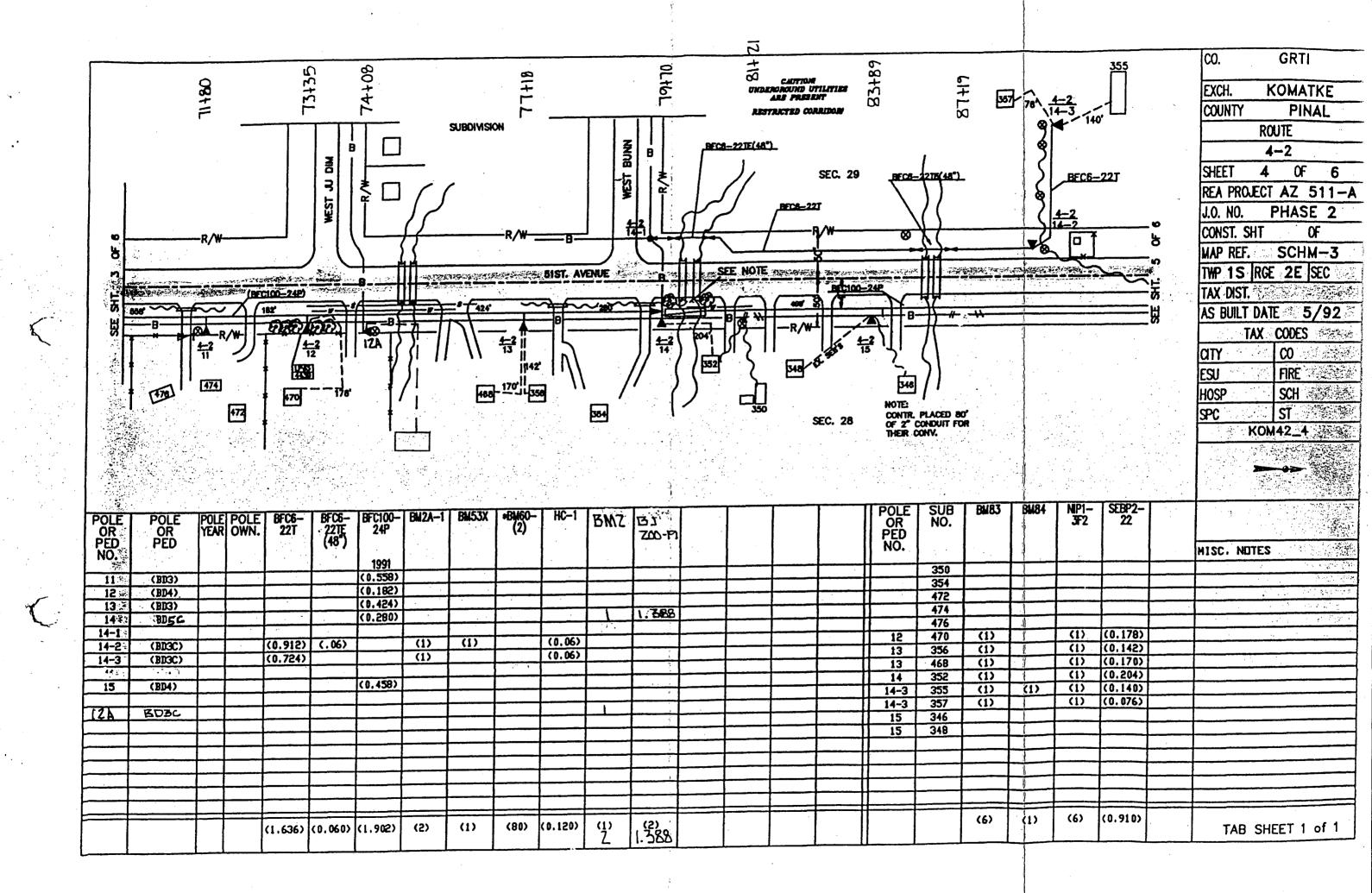


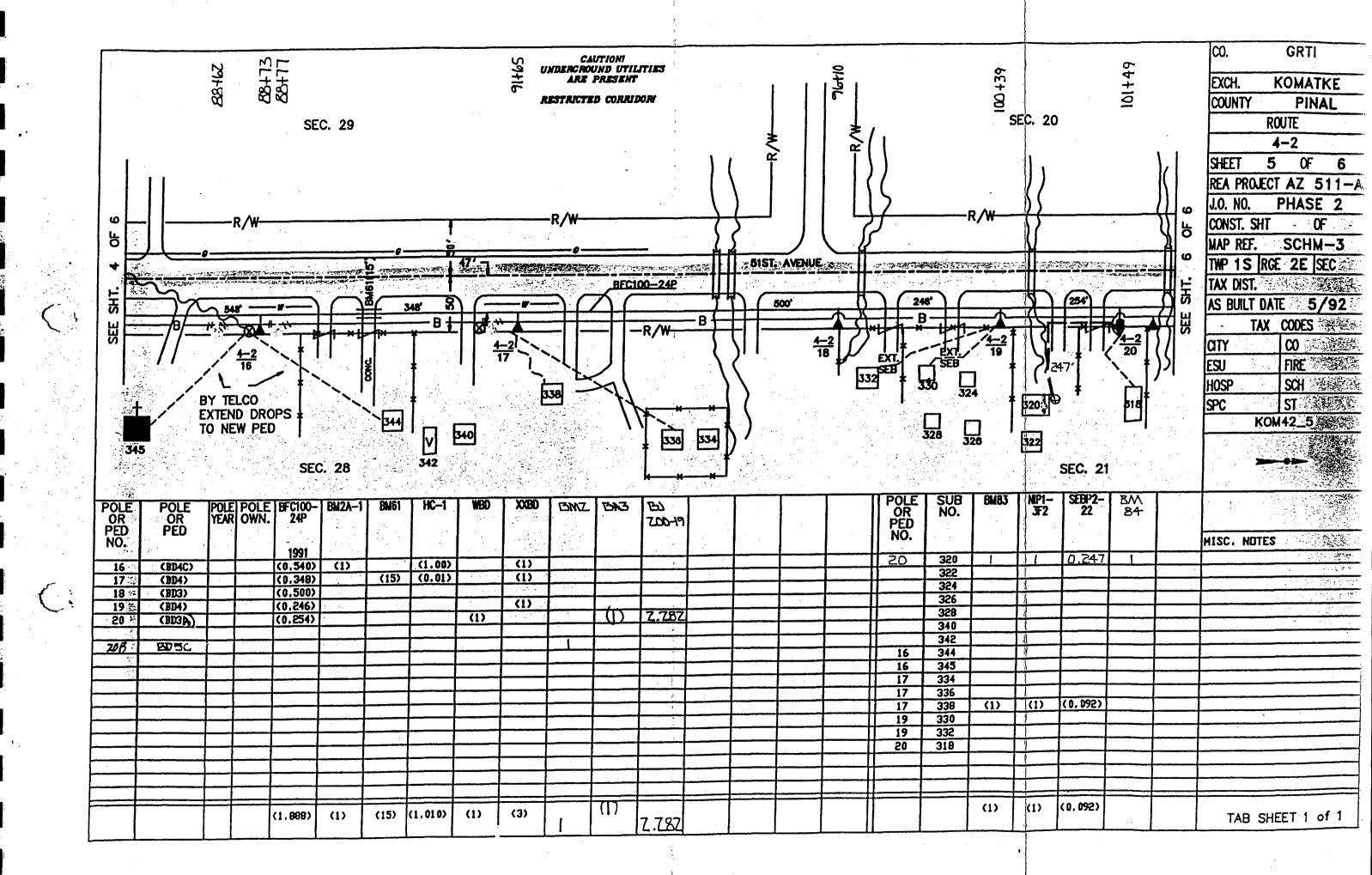


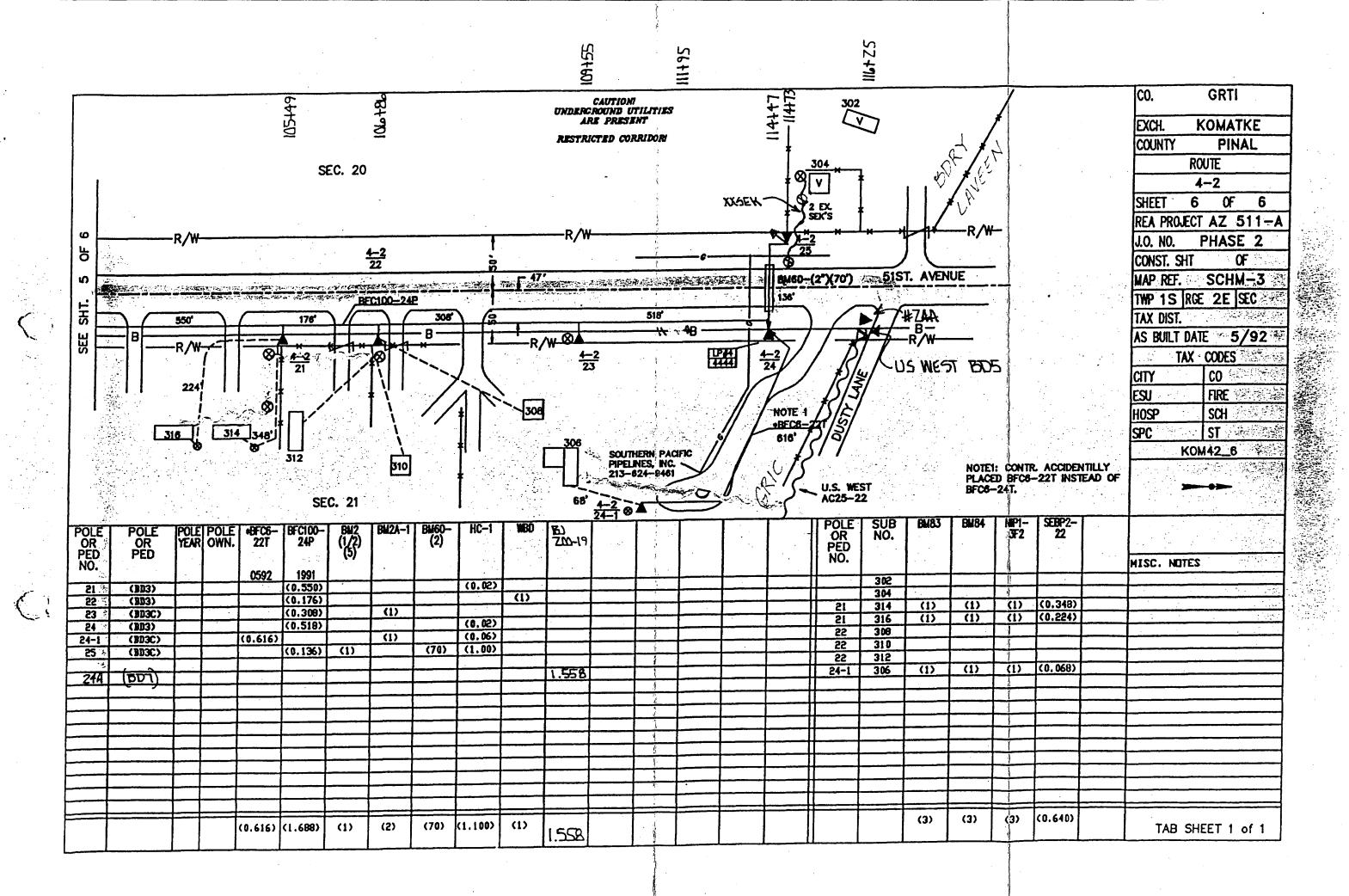




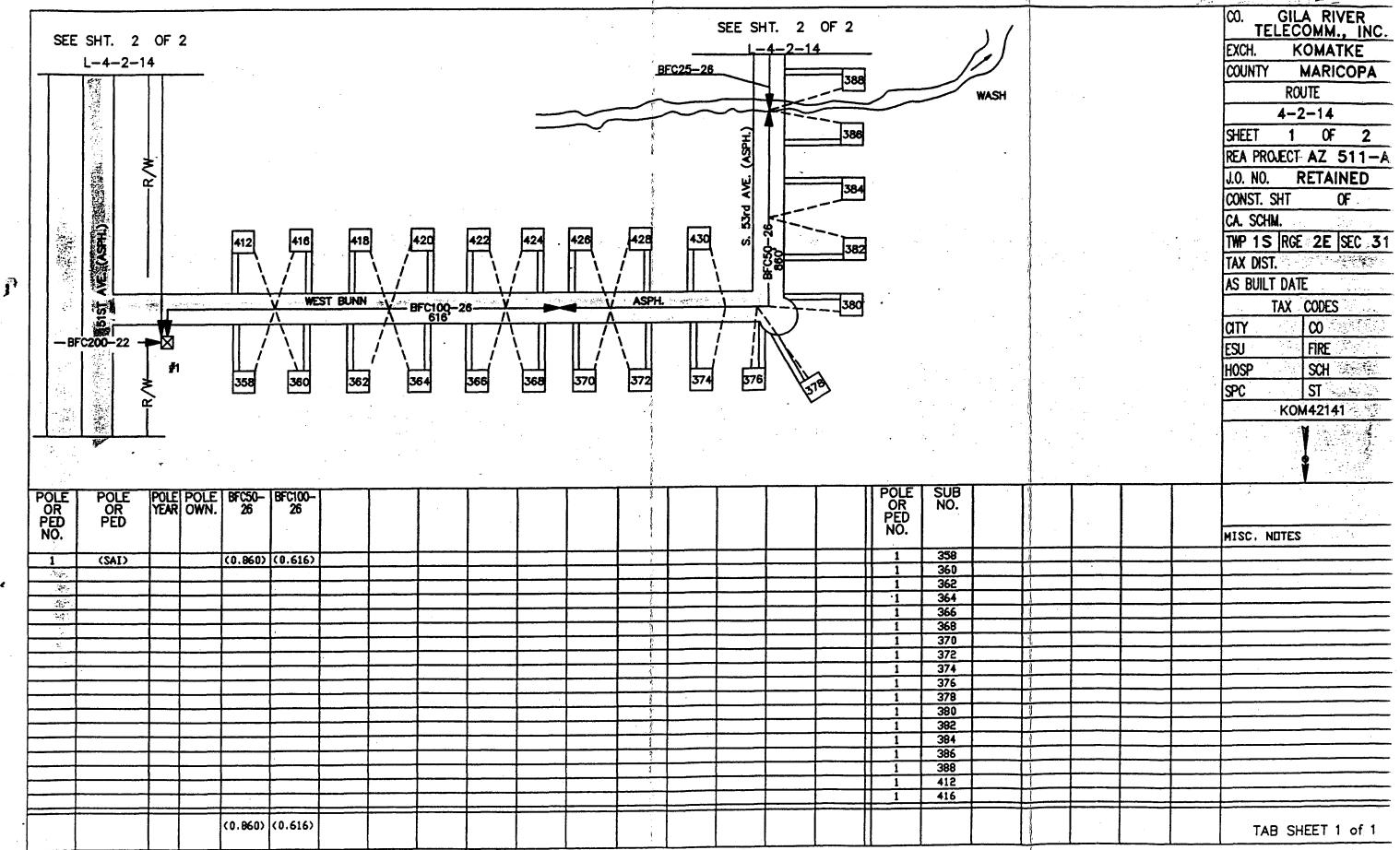








SUPPLEMENTAL



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